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TECHNICAL REPORT NO. 9387 (LL 109)

ATLAS OF OFF-ROAD GROUND ROUGHNESS P.S.D.'s AND
REPORT ON DATA ACQUISITION TECHNIQUE



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by

ATAC

COMPONENTS RESEARCH & DEVELOPMENT LABORATORIES

U.S. ARMY TANK AUTOMOTIVE CENTER WARREN, MICHIGAN

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ATLAS
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LAND LOCOMOTION LABORATORY

ABSTRACT

Power spectral densities, in one(line)and two(area) dimensions, are presented for off-road ground in eleven sites in the United States. Methods of acquiring, recording, and processing the data are described in detail.

FOREWORD

Ground roughness measurements on lines at three sites were given in a previous report and their power spectral densities (p.s.d.'s) displayed. These p.s.d.'s possessed many common characteristics and the question was raised by many as to whether these characteristics would persist for other sites. Moreover, no computer program was available for processing area data or even parallel line data.

These basic data and their p.s.d.'s are required in any vibrational analysis of the motion of a vehicle on open ground.

The opportunity arose in the summer of 1964 to acquire additional roughness data in the mid-continent of the United States.

GLOSSARY

Ground Profile is a plot of the survey height vs. distance along a line.

Power Spectral Density (p.s.d.) measures the amount of vibration, by frequency bands, of the ground heights.

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INTRODUCTION

The theory of land locomotion we are developing requires ground roughness spectra as input data. Line spectra have been obtained from a limited number of sites. However, vehicles make use of parallel tracks and the dynamical input from parallel tracks requires the spectra on each track and also the cospectra. A complete description of a site would require the spectra of a track and the cospectra of parallel tracks with different separations. Also, the spectra and co-spectra for tracks in different directions would be required. Fortunately, this total information is contained in the two-dimensional spectrum [See Report [1] (references) for a complete description].

The preparation of inputs to the differential equations of motion making use of the two-dimensional spectrum is described in References [2]. We are now in the process of comparing this first order theory with experiment.

Part of the basic information needed in this theory is a description of ground roughness in terms of p.s.d.'s (power spectral densities). In one of our reports [1], we presented p.s.d.'s obtained from data taken at three sites. Two of the sites had been modified by vehicle traffic. The three spectra had many points of similarity and some points of difference. We interpreted the spectra and compared them with the profile data. Certain questions remained outstanding which required, for their resolution, the acquisition of additional data:

- a) Are these p.s.d.'s typical?
- b) Can the major and relevant features of ground p.s.d.'s be summarized in a simple manner?
- c) Is it possible to estimate the relevant characteristics of ground roughness p.s.d.'s from information found in aerial photography, topographical and geographical maps, etc.?

It was therefore decided to compile a small atlas of ground roughness p.s.d.'s made at a variety of sites.

During a visit (May 1964) to Vicksburg the objectives were discussed. It was suggested there that we choose our sites at military installations that were being used by the MERS Project. This had the advantage that the sites were available for future vehicle testing. The MERS Project had compiled photographs and topographical maps of these installations, and the commanding officers had indicated their willingness to cooperate with MERS. The location and terrain characteristics of the installations were reviewed and preliminary selection was made at that time.

These selected installations were in the mid-continent so that a surveying crew could travel from one to another in a short summer period and make a maximum number of surveys at a variety of locations.

The Commanding Officer at ATAC sent a letter to each installation explaining our purpose and requesting permission to make an initial visit and then to make the required measurements at a subsequent time. It was also explained that we might need the services of a guide, etc.

Preliminary trips were made by MASC personnel to select sites at:

1. Fort Riley, Kansas
2. Camp Gruber, Oklahoma (abandoned)
3. Fort Carson, Colorado
4. Fort Sill, Oklahoma
5. Fort Hood, Texas
6. Fort Polk, Louisiana
7. Fort Benning, Georgia
8. Fort McClellan, Alabama

Two sites were selected at each installation after a reconnaissance of the general areas available to us. The sites were selected so there would be a maximum chance of availability within the next few years if vehicle tests were desired. In addition, the following considerations were used in site selection:

- a) relatively free of heavy ground cover so that the surveying operation would not be unduly hampered,
- b) relatively near access roads,
- c) relatively flat and of fairly uniform roughness characteristics over fairly large areas,
- d) relatively undeformed by vehicles.

Under no circumstances was it very difficult to meet the above conditions.

In all cases, the commanding officers and personnel of the installations gave outstanding cooperation.

In addition to the data collected above, other survey data are available at MASC. These data will also be included in the atlas. The locations of these additional sites are as follows:

- 9. Fort Knox, Kentucky
- 10. Aberdeen Proving Grounds, Maryland
- 11. Yuma Test Station, Arizona
- 12. Las Vegas, Nevada (Mercury Test Site of AEC)

Vehicle tests were conducted at Fort Sill, Las Vegas, and Thailand along with elevation surveys. Only the survey data associated with the first two vehicle test sites will be reported upon here; the vibration data will be discussed in a subsequent report. The Thailand data are on a road rather than open ground, and thus will not appear in this atlas.

With respect to the surveying program, a number of decisions were made by MASC.

It was decided to survey two sites at each installation, preferably of different character. Each site would provide area and line data. Preliminary reconnaissance indicated (see [1] for a discussion of details in planning experiments of this type) that a two-foot spacing would be sufficiently close to include all significantly high frequencies without aliasing. (Observation of the vehicle trials at Fort Sill suggests, however, that closer spacing may be necessary on rocky ground.)

The number of data points in a square was decided to be 10,000 (100 x 100) and for the line 500. The dimensions of the squares, therefore, were 200 ft. x 200 ft. and the lines were 1000' long. For convenience, we required the line to go through the center of the square. However, the angle of the line to the side of the square was left to the surveyors and a variety of angles was expected and obtained from the different sites.

Preliminary discussion with John Chen, a professional land surveyor, indicated that normal horizontal and vertical control within 1/100 of a foot and horizontal control 2/100 of a foot could easily be obtained. This is well within limits required by the dynamic problem. In view of the fact that loose material on the surface of the ground will give comparable deviation, the control was deemed adequate.

A survey crew was organized under the leadership of Dr. Jay Barton, a biophysicist at St. Joseph College, Rensselaer, Indiana. The crew consisted of Arthur Hawkins, Donald Paarlberg, Jr., John Foster, Paul F. Chenea, Jr., and William Whistler. Of these Dr. Barton and Arthur Hawkins had surveying experience. The others were college students on summer vacation.

Under the direction of Dr. Barton, and with advice of Mr. John Chen, equipment and other necessary items were selected and acquired. The equipment and crew were fitted into a standard Chevrolet Station Wagon rented for the purpose. There was a short training period during which the crew practiced stowing the equipment and carrying out the surveys. The tour was completed ahead of schedule without mishaps to personnel or equipment.

On the average, it took four days to complete the surveys at an installation and approximately one and a half days to travel between installations. Approximately 180,000 data points were acquired by this crew.

The surveying equipment included the following major items:

- 2 Repeating Theodolites, K&E 730050
- 2 Self-Leveling Zeiss Levels, K&E 750020
- 2 Lenker Elevation Leveling Rods

In addition, the equipment included both steel and cloth tapes, marking pins, range poles, etc. A complete list of surveying equipment is given in Appendix A.

In addition to the survey data, the following data were acquired at each site. The reconnaissance party located the survey sites on topographical maps, and marked them on the ground with paint, plastic tape, etc. The orientation of the survey lines and squares was noted by the survey party. Verbal descriptions were made and in some cases photographs were taken to further identify sites.

The survey data plus the other material discussed above taken at a site were returned each week to MASC by registered mail. On his return from the surveying operations, Dr. Barton put the survey data in order for data processing. Dr. Barton also remained on the staff of MASC to assist in the data processing.

The data were put on IBM cards, the cards were pre-processed to remove the instrument height and compare each data point with its nearest neighbors. The output was listed and large deviations were marked by an asterisk. These marked points were compared by Dr. Barton with the data in the survey books and any errors were corrected. The corrections were not made on the IBM cards but rather on the input tapes. Both cards and tape are stored at MASC and copies are available at cost upon request.

This report is the first of two reports. In this report, we shall be concerned with presenting the computational results, the site description, and the computing programs. Conclusions and recommendations will be concerned with data acquisition methods and processing. The second report will deal with the interpretation and implication of these results.

OBJECT

The object of this report is to present the results of mid-continent surveys and the computations performed. Interpretations will, to a large part, be presented in the next report. Recommendations will be limited to the recording, acquisition, and processing of the data.

SUMMARY

A short description is given of the survey methods and the equipment used. This is followed by a table listing all site locations and orientations of the squares and line surveyed. The results (p.s.d.'s in numerical form and graphs of the p.s.d.'s) of one-dimensional (line) surveys are presented next; results for parallel lines are also included. The section which follows presents similar results for two-dimensional (area) data.

Complete descriptions of the two computer programs are given.

CONCLUSIONS

The p.s.d.'s obtained from the data taken at the additional sites show the same general features noted in the previous report.

Rod and level survey methods of data acquisition are cheap and efficient.

RECOMMENDATIONS

Further data acquisition by the methods used for the purpose of enlarging this atlas are not recommended.

When roughness data are required for special purposes, however, the rod and level method used is recommended. Self-leveling levels and self-zeroing rods are recommended as basic equipment.

SITE DESCRIPTION

Survey sites are located with reasonable accuracy on topographical maps along with verbal descriptions and in some cases photographs. No attempt was made to preserve the exact locations of data points; first, this is not relevant from the point of view of p.s.d. analysis; second, to do this, permanent markers would have had to be erected and permission to do this was thought to be hard to obtain. At this point, it should be emphasized that the data were acquired to make a statistical estimate of a roughness characteristic and not to provide an exact description of ground elevation. Our results should be regarded as reproducible within the statistical accuracy to be described later. For this reason, the exact relocation of data points is considered to be unnecessary.

If vehicle tests are to be conducted at a site at which a survey has been made, our results will be useful in general selection considerations. When vehicle tests are made, our exact site might not be the most convenient; even if it is, ground deformation may occur due to a variety of factors associated with vehicle weight, ground moisture, etc. Hence, surveys along actual tracks may prove necessary.

The site description information is summarized in Table I. Additional information is available at MASC.

The sites coded by letters A-U are those surveyed in the summer of 1964. Some additional lines were surveyed at Ft. Sill in connection with vehicle trials conducted there. Lines L and M are on half of the previously surveyed lines of G and H. In particular, care was taken in conducting the trial at Site 2 so that the wheel track was exactly on the 1000 foot line and so the first half of line H represents the ground heights before and M the ground heights after modification by the vehicle.

The remaining sites, given by names, were surveyed earlier.

TABLE I

Revised 8/8/66

SITE	INSTALLATION	MAP LOCATION	AZIMUTH OF X-AXIS DEGREES E OF NO.	ANGLE OF LINE WITH X-AXIS, DEGREES COUNTER- CLOCKWISE	
A	Fort Riley, Kan. W. of Manhattan	USGS Ft. Riley, Kan Twp. 11S, R. 5E, Sec. 6	15	47	
B	Fort Riley, Kan.	USGS Ft. Riley, Kan. Twp. 10S, R. 5E, Sec. 12	335	30	
C	Camp Gruber, Okla. E. of Muskogee	USGS Webber's Falls Twp. 14N, R. 20E, Sec. 11	280	160	
D	Camp Gruber, Okla.	USGS Webber's Falls Twp. 14N, R. 20E, Sec. 23	45	135	
E	Ft. Carson, Colo. S. of Colo. Sprgs.	USGS Timber Mountain Twp. 17S, R. 67W, Sec. 1	340	171	
F	Ft. Carson, Colo.	USGS Timber Mountain Twp. 17S, R. 67W, Sec. 1	170	43	
G	Ft. Sill, Okla. N. of Lawton (Site 1)	USGS Cache Twp. 3N, R. 13W, Sec. 20 & 21	320	2	

Table I (Cont'd.)

			Revised 8/8/66	
SITE	INSTALLATION	MAP LOCATION	AZIMUTH OF X-AXIS DEGREES E. of N.	ANGLE OF LINE WITH X-AXIS DEGREES COUNTER- CLOCKWISE
H	Ft. Sill, Okla. (Site 2)	USGS Cache Twp. 3N, R. 13W, Sec. 20 & 21	260	128
J	Ft. Sill, Okla. (Site 3)	Same as above	No Square Two Track Line	Azimuth 129
K	Ft. Sill, Okla. (Site 4)	Same as above	No Square Two Track Line	Azimuth 173
L	Ft. Sill, Okla. (Site 1)	Same as above	No Square Two Track Line	Azimuth 318
M	Ft. Sill, Okla. (Site 2)	Same as above	No Square One Track Line	Azimuth 313
N	Ft. Hood, Tex. N. of Killeen	USGS Fort Hood 97° 50'W, 31° 12'N	136	16
O	Ft. Hood, Tex.	USGS Fort Hood 97° 53'W, 31° 11'N	41	35
P	Ft. Polk, La. E. of Leesville	USGS Slagle Twp. 2N, R. 7W, Sec. 23	180	50 (900' Line)

Table I (Cont'd.)

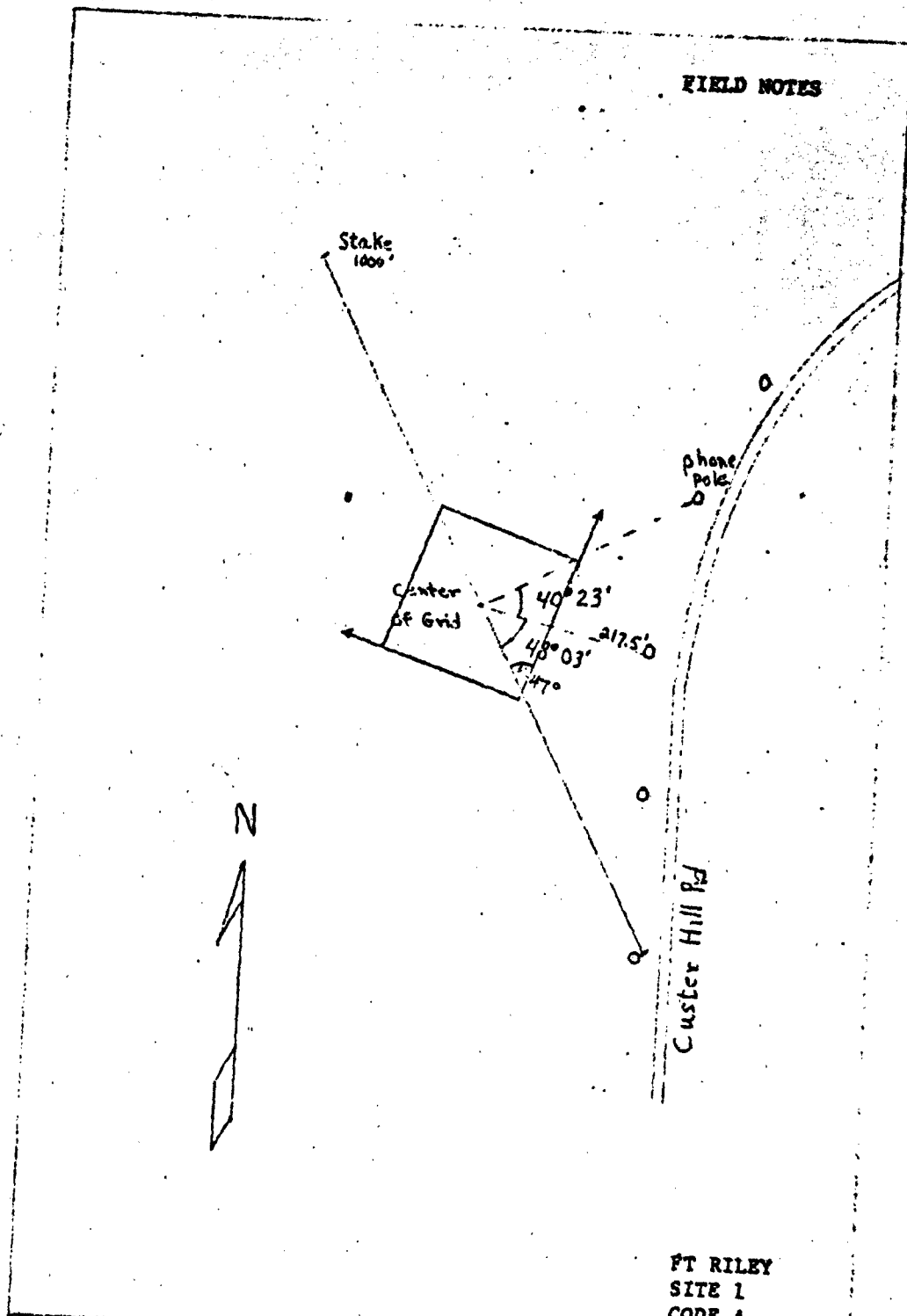
Revised 8/8/66			ANGLE OF	
SITE	INSTALLATION	MAP LOCATION	AZIMUTH OF X-AXIS DEGREES E OF N.	LINE WITH X-AXIS DEGREES COUNTER- CLOCKWISE
Q	Ft. Polk, La.	USGS Slagle Twp. 2N, R. 7W, Sec. 23	140	90 (900' Line)
R	Ft. Benning, Ga. S. of Columbus	USGS Columbus Mil Grid 932697	335	176
S	Ft. Benning, Ga.	USGS Columbus Mil Grid 934698	176	45
T	Ft. McClellan, Ala. N. of Anniston	USGS Anniston Twp. 15S, R. 7E, Sec. 16	130	0
U	Ft. McClellan, Ala.	USGS Anniston Twp. 15S, R. 8E, Sec. 2	186	45
Aberdeen 1	Aberdeen Proving Grounds, Md.	No Data		
Aberdeen 2	As Above	No Data		
Knox 1	Ft. Knox, Ky.	Army Map Serv. 10-55 600060 Sheet 3759I NE Ser. V835 Mil Grid 863049	355	No Line

Table I (Cont'd)

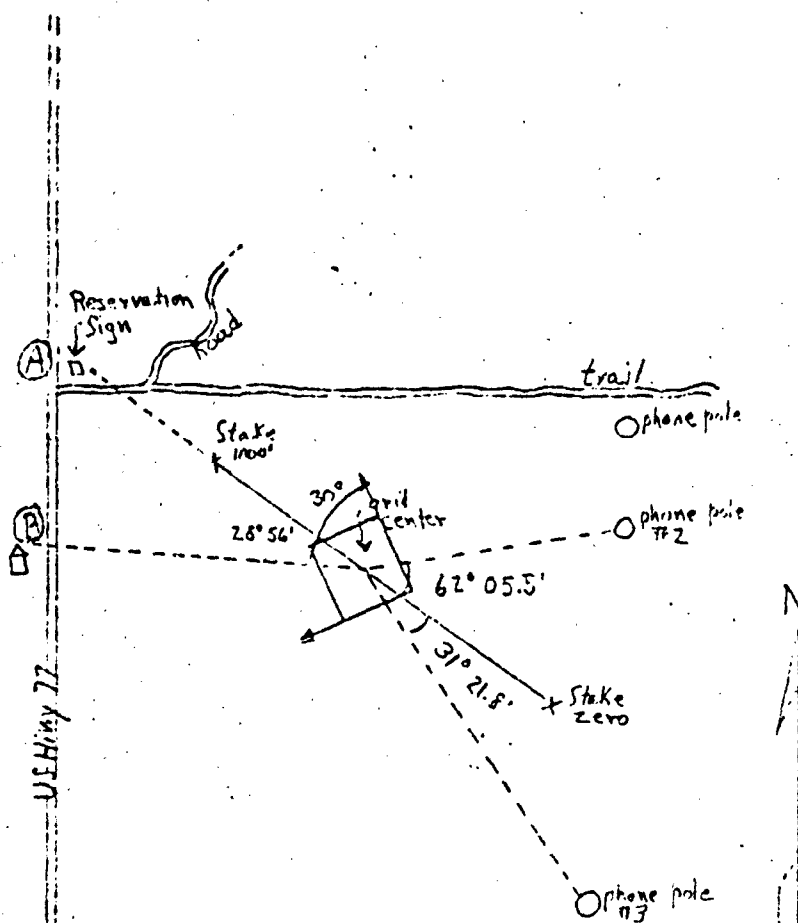
Revised 8/8/66

SITE	INSTALLATION	MAP LOCATION	AZIMUTH OF X-AXIS DEGREES E of N.	ANGLE OF LINE WITH X-AXIS DEGREES COUNTER- CLOCKWISE	
Yuma 1	Yuma Test Station N. of Laguna, Ariz.	USGS Laguna 114° 24.2'W 32° 55'N	290		No Line
Yuma 2	Yuma Test Station	USGS Laguna 32° 51.7'N 114° 22.5'W	227		155
Las Vegas	AEC Nevada Test Site Mercury, Nevada	On Buckboard Mesa	No Square		Azimuth 118

FIELD NOTES



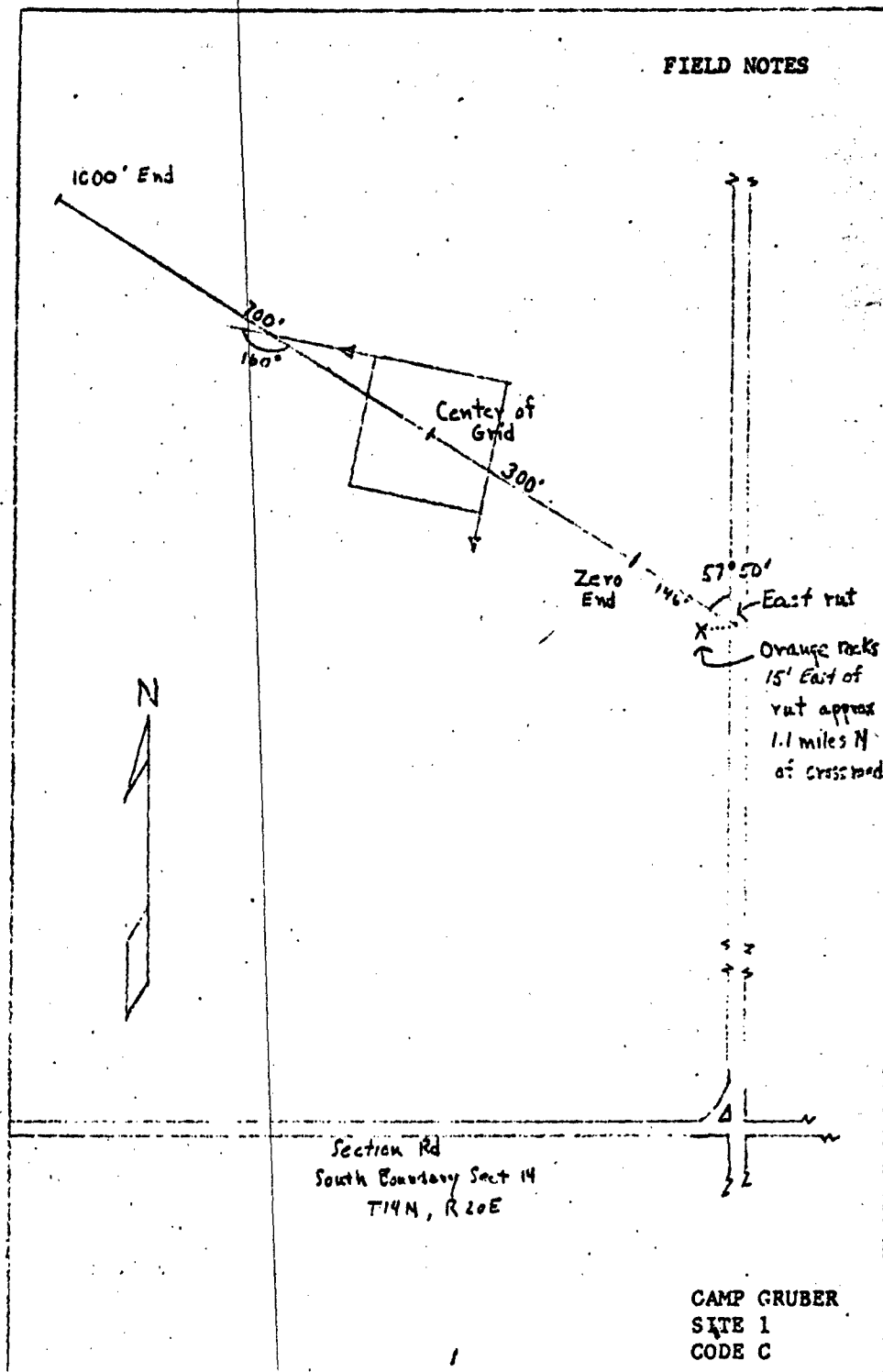
FT RILEY
SITE 1
CODE A



A - Rt. side reservation sign
B - Peak of roof, Sweitzer farmhouse
grid center approx. 600' south of trail

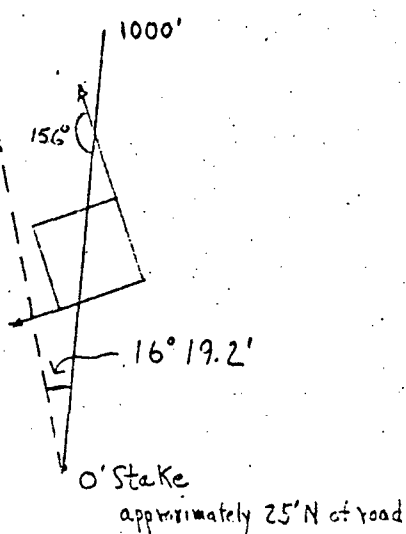
FT RILEY
SITE 2
CODE B

FIELD NOTES



FIELD NOTES

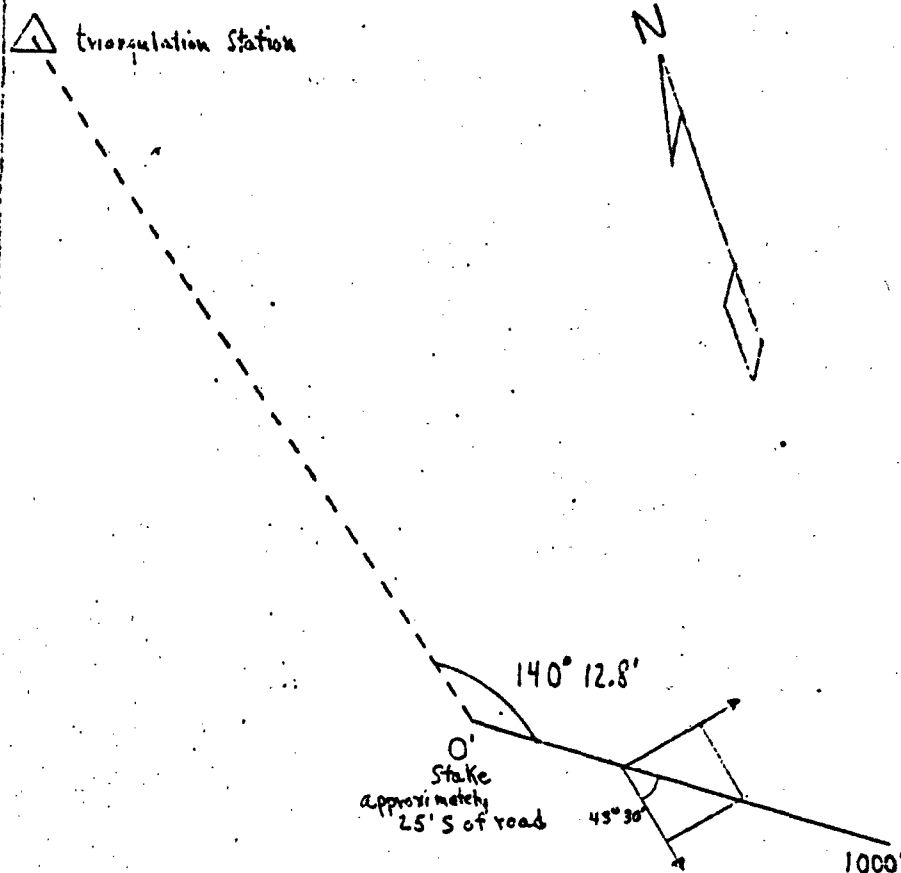
△ triangulation station



Bearing of line N 3° 30' E
grid azimuth

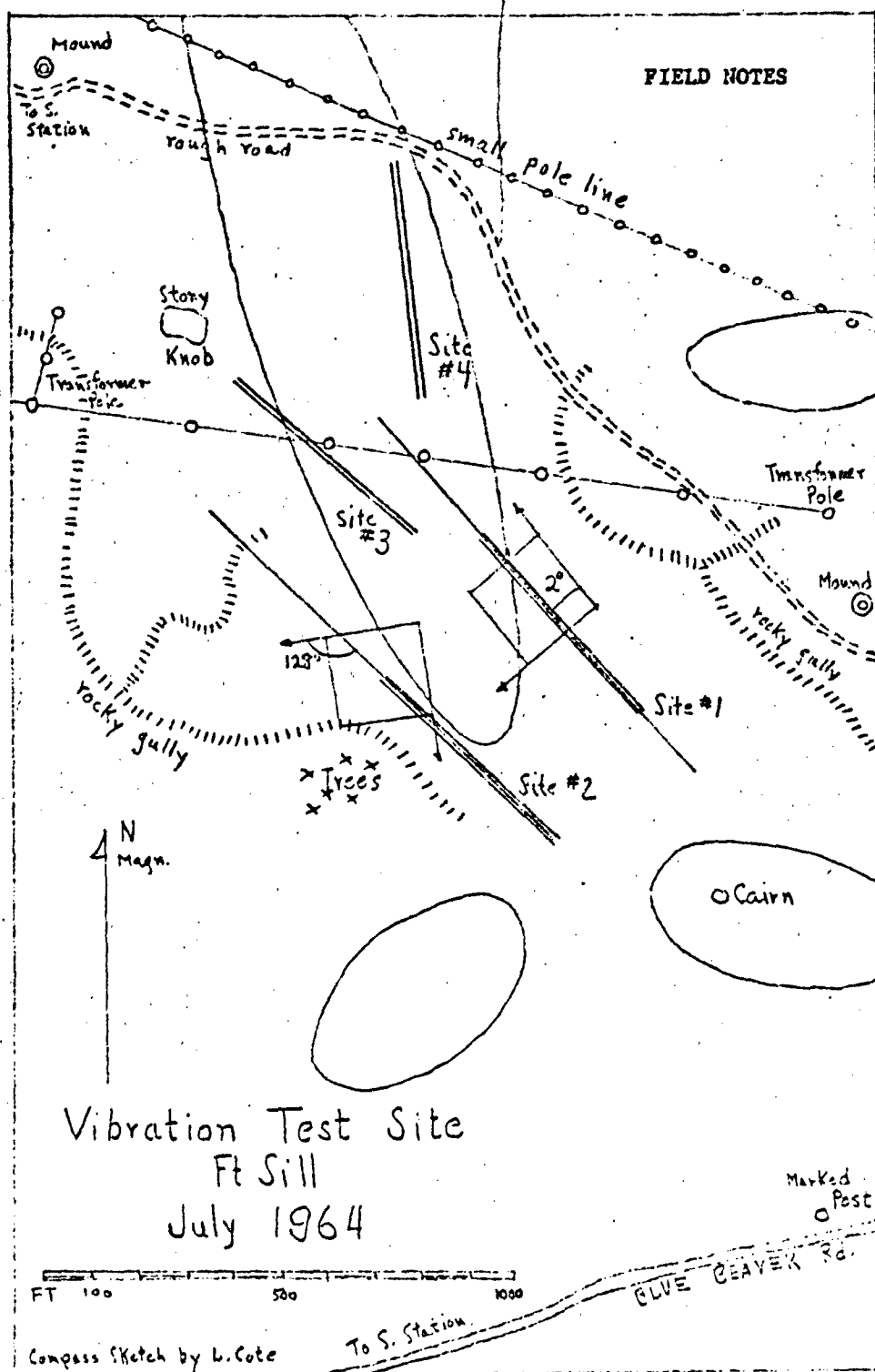
FT CARSON
SITE 1
CODE E

FIELD NOTES

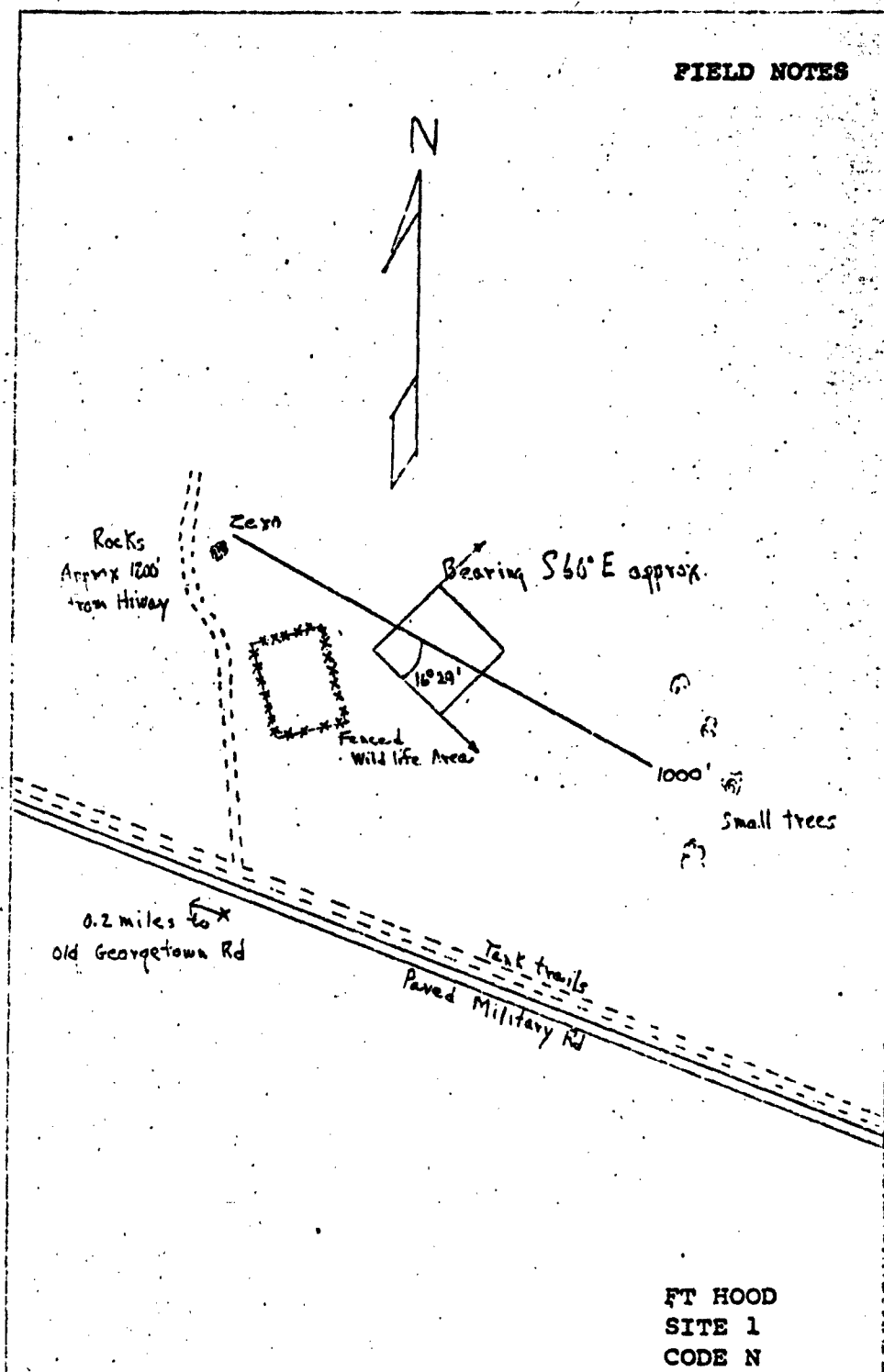


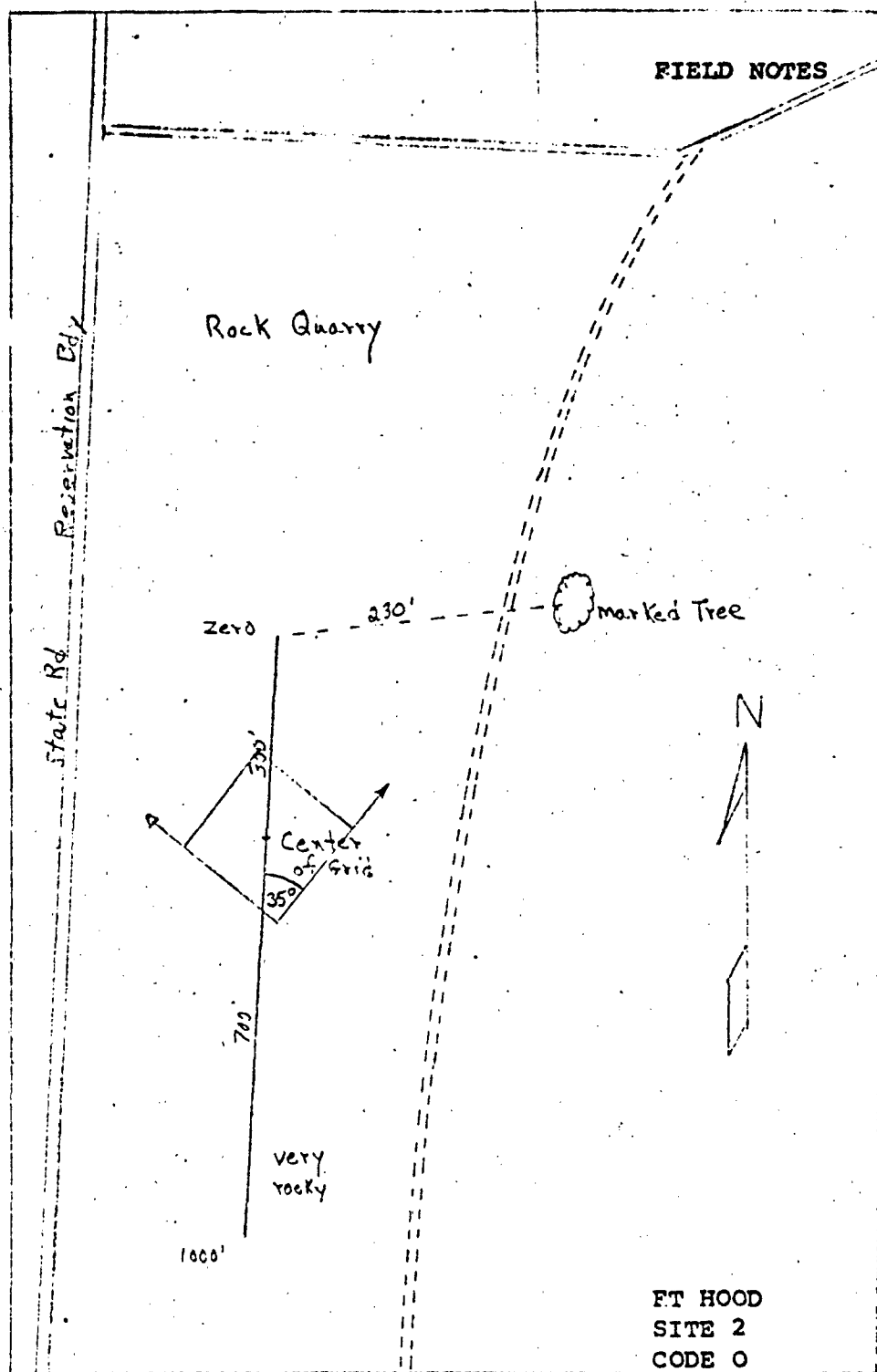
Bearing of line $S 52^{\circ} 30' E$
grid azimuth

FT CARSON
SITE 2
CODE F

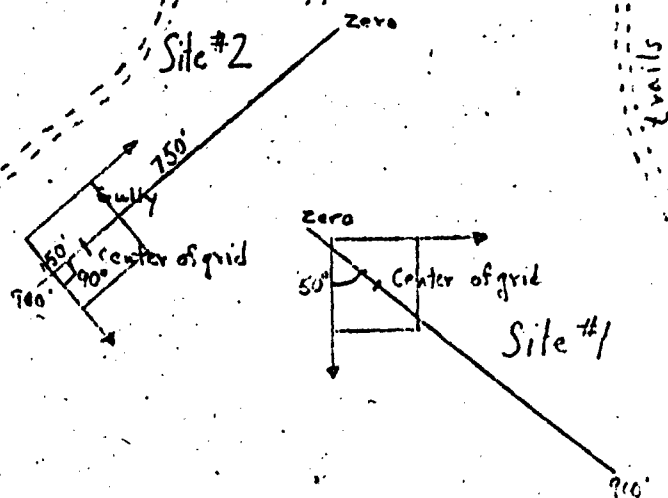


FIELD NOTES





FIELD NOTES

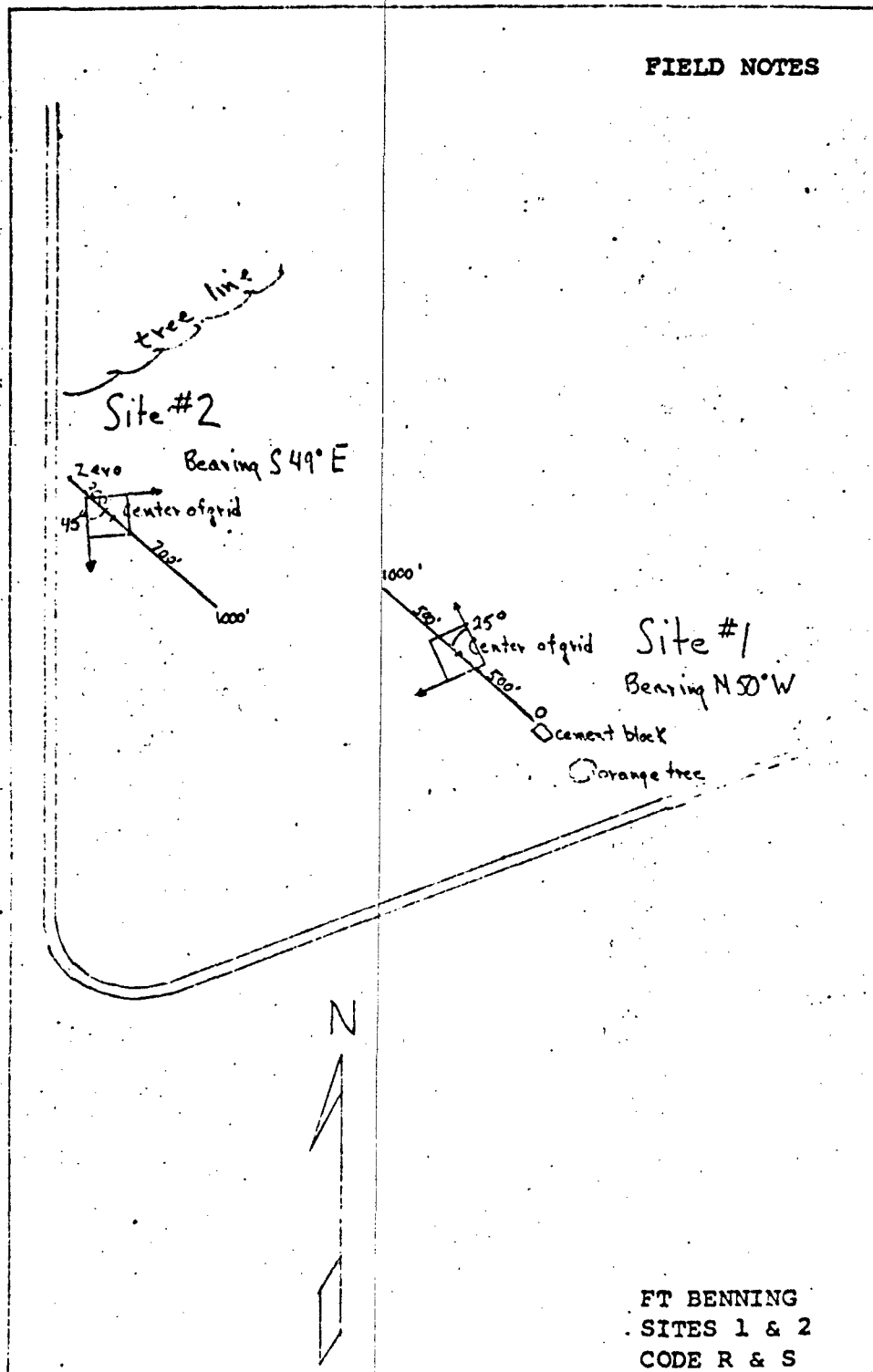


Military Rd

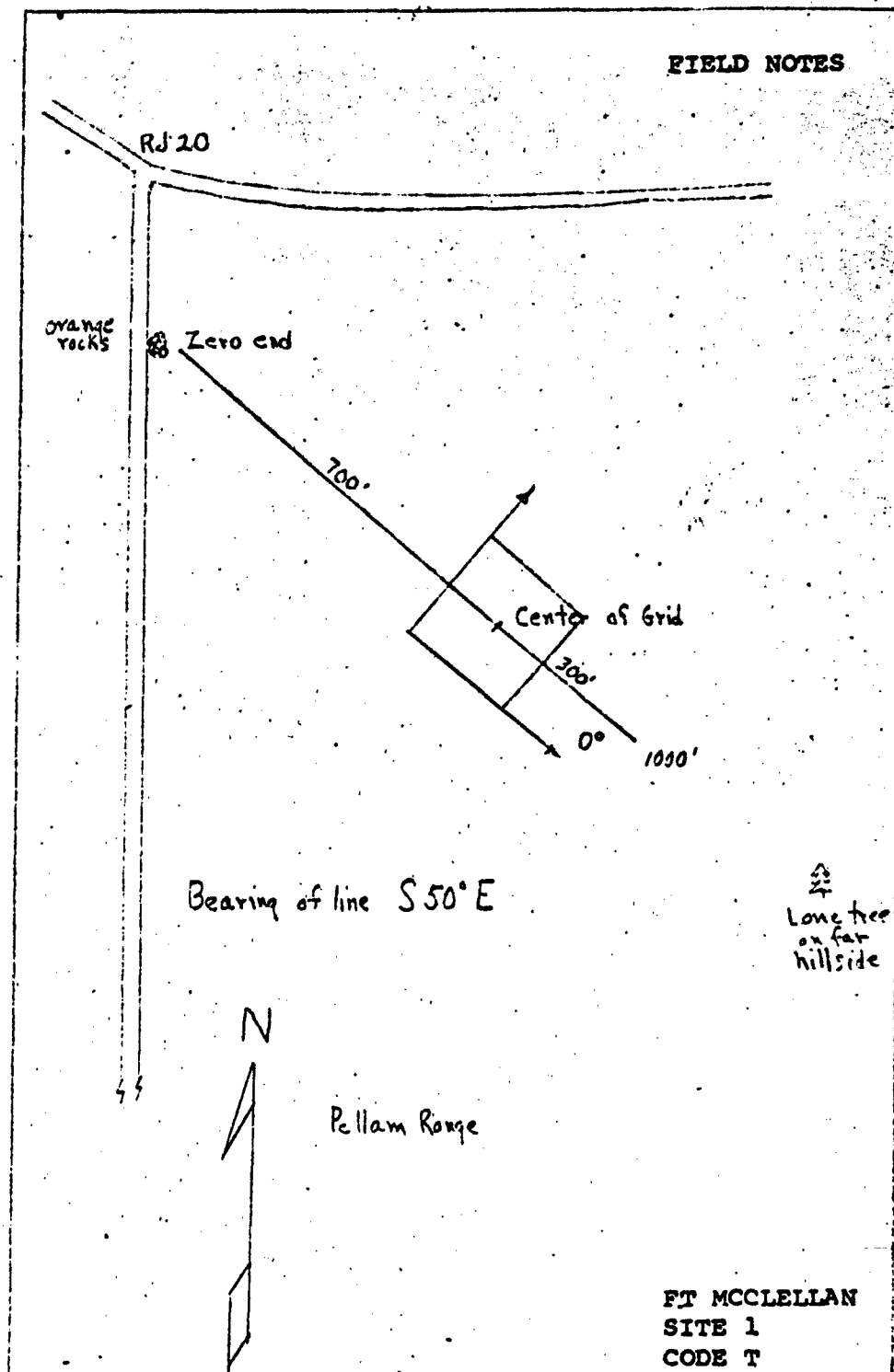
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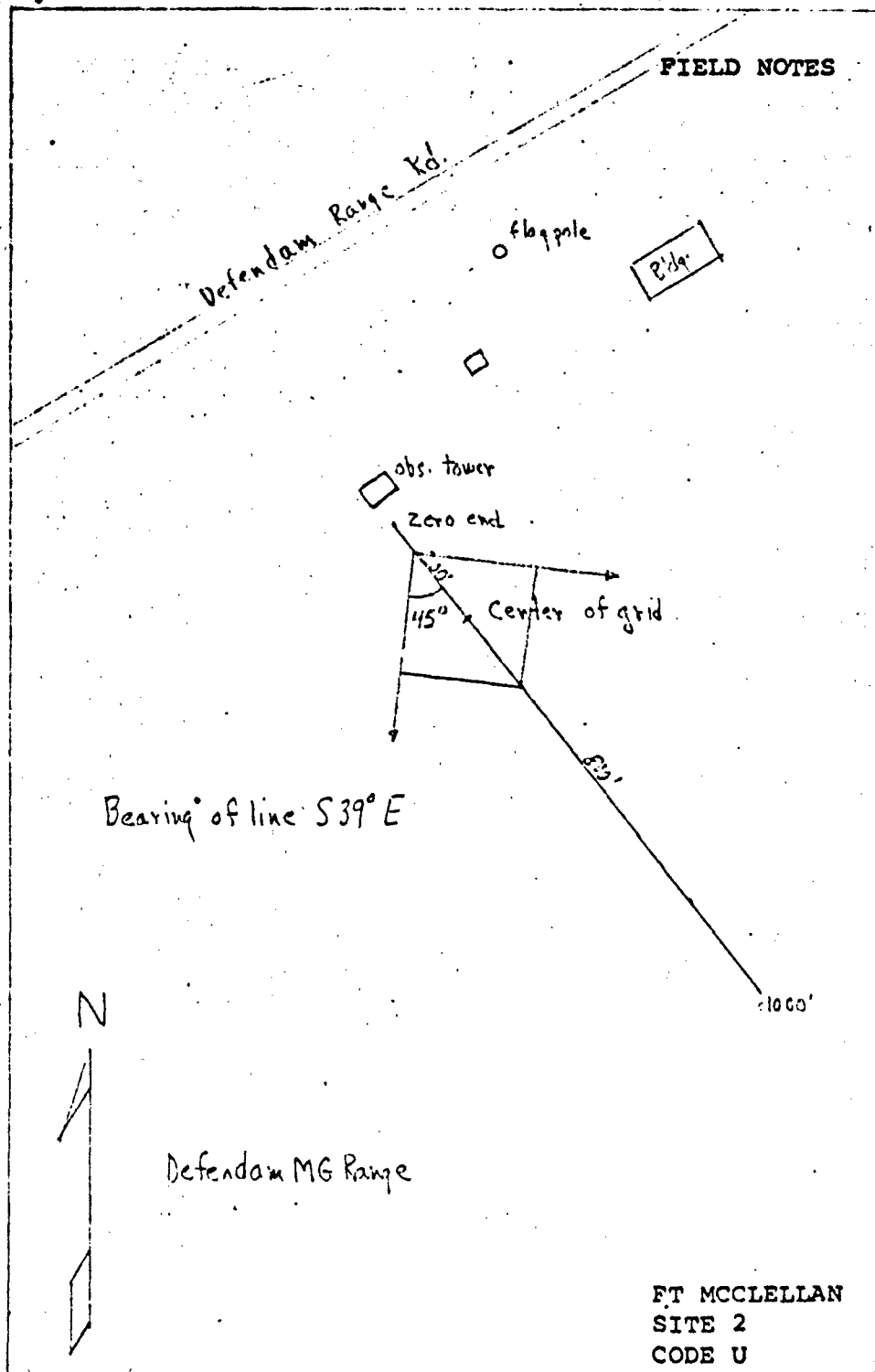
FT POLK
SITES 1 & 2
CODES P & Q

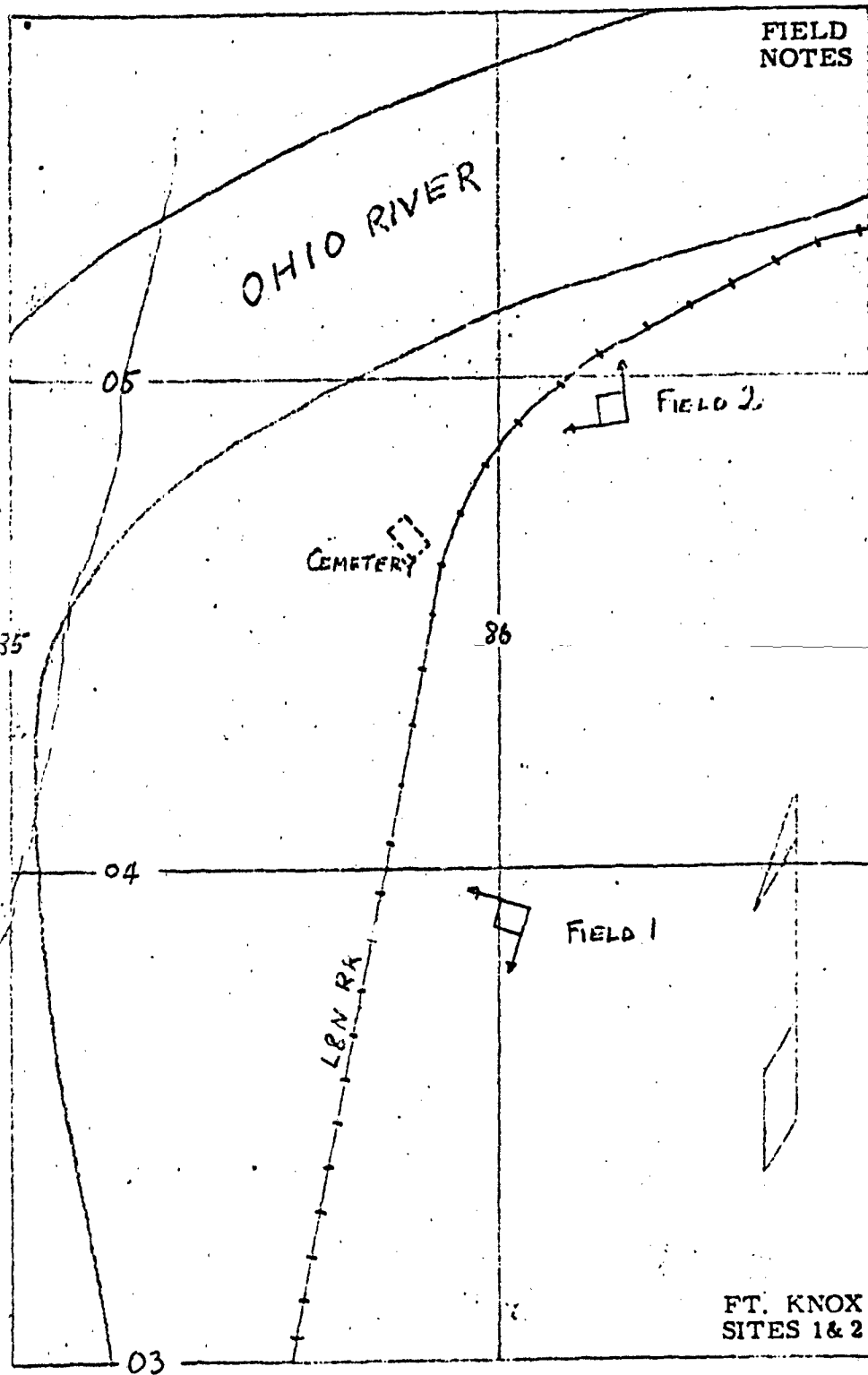
FIELD NOTES

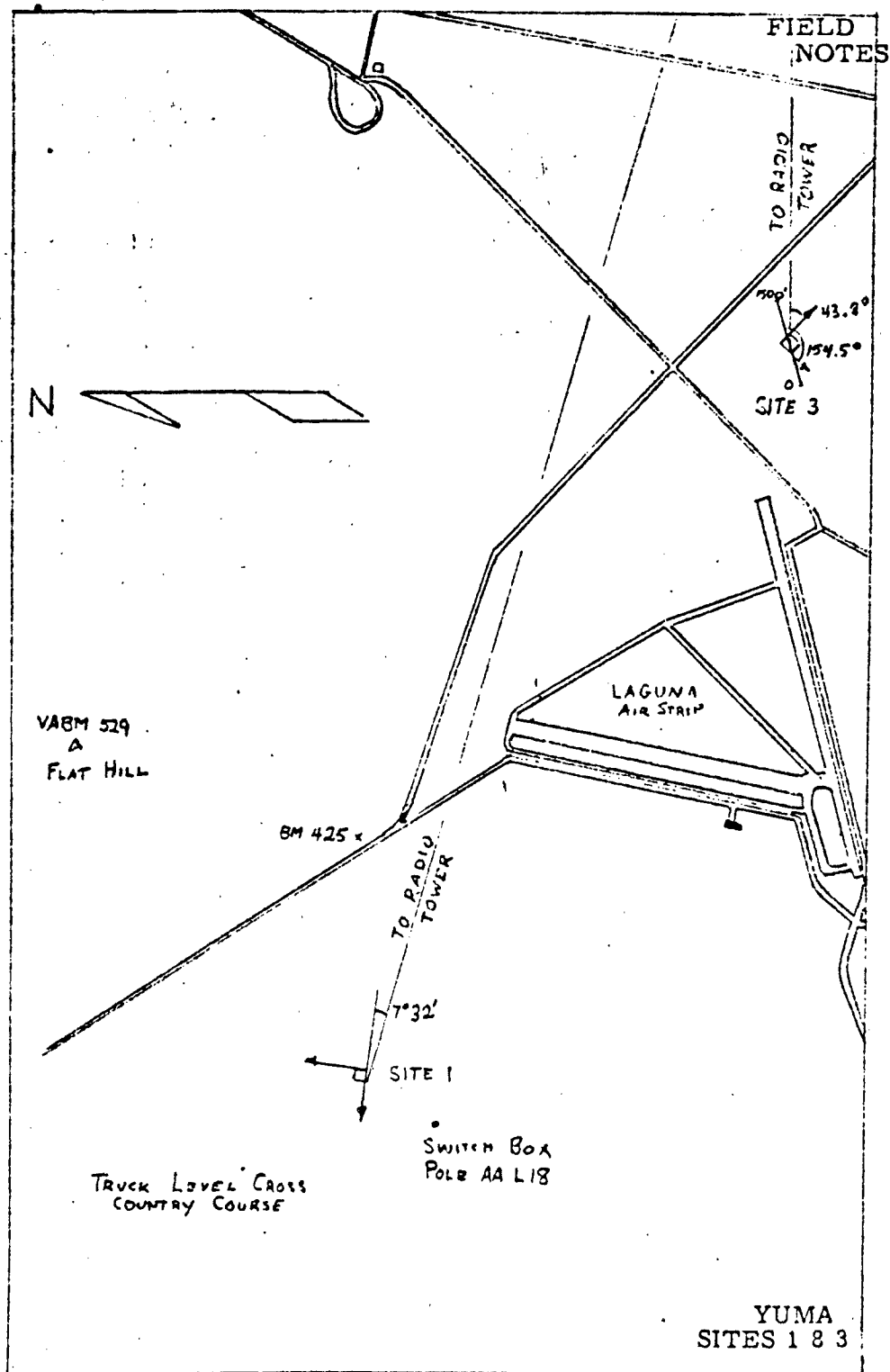


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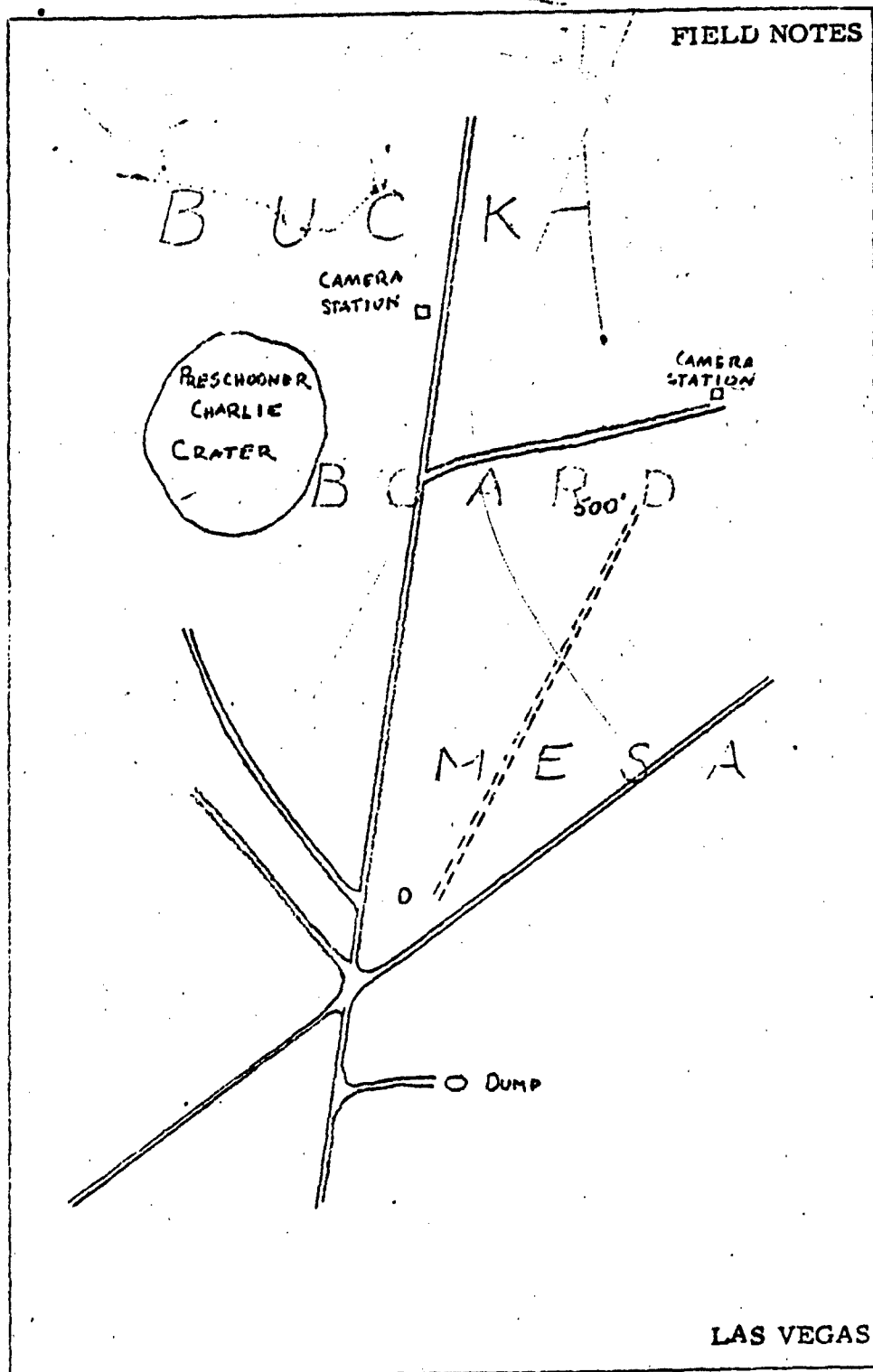








FIELD NOTES



LINE SPECTRA

Our methods of obtaining p.s.d. estimates for line data are described in [1]. They will not be repeated here. However, a description of computation is given in the section on computations.

We present in this section the spectral estimates in a numerical table, and graphs on semi-log paper of the spectral estimates. Each of the two-track spectra will be graphed on the same sheet for comparison purposes.

Co-spectra between parallel lines are needed in vehicle motion analysis. They have been computed where parallel line surveys were conducted. These co-spectra are presented in tabular form only, since plots are difficult to interpret.

The statistical accuracy of the spectra of the 1000 feet lines may be given in several ways. Each estimate has 18 degrees of freedom or, in other words, a confidence interval at 95% confidence may be found by using the factors .571 and 2.186. [We are 95% confident that the true spectral value lies between .571 times the estimate and 2.186 times the estimate.] The computations are made according to pp 28-30 of [1].

The raw elevation data on IBM cards may be obtained at cost from MASC.

SPECTRAL ESTIMATES FOR

RILEY 1 LINE A

-31-

ITEM A

P	WX(P)
0	----
1	2.544E 01
2	2.088E 00
3	2.992E-01
4	9.556E-02
5	9.669E-02
6	7.378E-02
7	3.810E-02
8	1.793E-02
9	1.836E-02
10	2.130E-02
11	2.396E-02
12	3.677E-02
13	3.706E-02
14	2.054E-02
15	1.147E-02
16	8.753E-03
17	6.620E-03
18	6.884E-03
19	7.776E-03
20	7.851E-03
21	7.742E-03
22	8.993E-03
23	9.915E-03
24	7.609E-03
25	5.666E-03
26	8.499E-03
27	1.122E-02
28	1.272E-02
29	1.267E-02
30	1.088E-02
31	9.100E-03
32	7.546E-03
33	6.229E-03
34	4.186E-03
35	4.337E-03
36	5.787E-03
37	4.834E-03
38	4.550E-03
39	5.406E-03
40	5.327E-03
41	5.308E-03
42	5.299E-03
43	4.685E-03
44	4.082E-03
45	4.433E-03
46	6.458E-03
47	8.227E-03
48	6.721E-03
49	5.557E-03
50	6.120E-03

SPECTRAL ESTIMATES FOR

RILEY 2 LINE B

-32-

ITEM A

P	WX(P)
0	-----
1	1.203E 00
2	2.243E-01
3	1.087E-01
4	8.534E-02
5	4.978E-02
6	2.396E-02
7	3.125E-02
8	5.646E-02
9	7.093E-02
10	6.972E-02
11	6.049E-02
12	4.057E-02
13	3.073E-02
14	4.087E-02
15	5.175E-02
16	6.365E-02
17	6.771E-02
18	5.056E-02
19	2.838E-02
20	1.795E-02
21	2.265E-02
22	3.071E-02
23	2.921E-02
24	2.438E-02
25	2.787E-02
26	3.355E-02
27	3.011E-02
28	2.427E-02
29	2.103E-02
30	2.478E-02
31	3.032E-02
32	2.826E-02
33	2.805E-02
34	2.617E-02
35	2.042E-02
36	1.978E-02
37	2.169E-02
38	1.998E-02
39	1.759E-02
40	1.670E-02
41	1.269E-02
42	1.100E-02
43	1.791E-02
44	2.603E-02
45	2.125E-02
46	1.073E-02
47	9.850E-03
48	1.200E-02
49	1.544E-02
50	1.863E-02

ITEM A

P	WX(P)
0	-----
1	2.149E 00
2	2.880E-01
3	6.543E-02
4	1.565E-02
5	1.711E-02
6	2.033E-02
7	1.835E-02
8	1.607E-02
9	1.239E-02
10	8.907E-03
11	9.608E-03
12	1.143E-02
13	1.338E-02
14	1.534E-02
15	1.142E-02
16	6.170E-03
17	5.095E-03
18	5.554E-03
19	6.106E-03
20	7.327E-03
21	9.803E-03
22	9.189E-03
23	7.117E-03
24	7.438E-03
25	6.614E-03
26	6.596E-03
27	9.409E-03
28	9.730E-03
29	7.815E-03
30	8.589E-03
31	9.228E-03
32	6.939E-03
33	4.723E-03
34	5.850E-03
35	8.545E-03
36	9.183E-03
37	7.529E-03
38	6.140E-03
39	8.922E-03
40	1.007E-02
41	8.365E-03
42	1.115E-02
43	1.144E-02
44	7.109E-03
45	4.818E-03
46	5.149E-03
47	6.473E-03
48	6.293E-03
49	6.853E-03
50	8.048E-03

SPECTRAL ESTIMATES FOR

GRUBER 2 LINE D

-34-

ITEM A

P	WX(P)
0	-----
1	1.905E 01
2	3.259E 00
3	8.841E-01
4	3.690E-01
5	1.950E-01
6	1.425E-01
7	1.285E-01
8	1.190E-01
9	1.185E-01
10	9.107E-02
11	5.692E-02
12	4.256E-02
13	4.023E-02
14	4.446E-02
15	4.998E-02
16	4.710E-02
17	3.143E-02
18	2.917E-02
19	3.701E-02
20	2.718E-02
21	1.756E-02
22	1.775E-02
23	1.660E-02
24	1.721E-02
25	2.067E-02
26	1.911E-02
27	1.374E-02
28	1.255E-02
29	1.194E-02
30	1.040E-02
31	9.920E-03
32	9.679E-03
33	1.006E-02
34	1.124E-02
35	1.163E-02
36	1.027E-02
37	8.567E-03
38	7.415E-03
39	6.775E-03
40	6.220E-03
41	7.433E-03
42	1.026E-02
43	9.497E-03
44	6.022E-03
45	5.512E-03
46	5.822E-03
47	6.107E-03
48	6.282E-03
49	4.647E-03
50	3.736E-03

SPECTRAL ESTIMATES FOR

CARSON 1 LINE E

-35-

ITEM A

P	WX(P)
0	-----
1	2.411E 00
2	2.971E-01
3	1.015E-01
4	6.537E-02
5	5.168E-02
6	3.770E-02
7	2.962E-02
8	2.752E-02
9	2.460E-02
10	1.871E-02
11	1.333E-02
12	9.154E-03
13	6.060E-03
14	7.755E-03
15	1.298E-02
16	1.399E-02
17	1.167E-02
18	1.011E-02
19	8.764E-03
20	1.105E-02
21	1.597E-02
22	1.445E-02
23	7.454E-03
24	5.701E-03
25	7.580E-03
26	7.095E-03
27	6.790E-03
28	5.732E-03
29	3.538E-03
30	3.776E-03
31	5.034E-03
32	5.237E-03
33	4.777E-03
34	4.040E-03
35	4.127E-03
36	4.356E-03
37	3.822E-03
38	4.140E-03
39	5.120E-03
40	5.476E-03
41	5.847E-03
42	4.943E-03
43	2.794E-03
44	2.468E-03
45	3.352E-03
46	3.665E-03
47	3.471E-03
48	3.494E-03
49	4.302E-03
50	4.853E-03

SPECTRAL ESTIMATES FOR CARSON 2 LINE F -36-

ITEM A

P	WX(P)
0	----
1	9.254E 00
2	8.074E-01
3	2.365E-01
4	1.093E-01
5	5.708E-02
6	3.408E-02
7	1.997E-02
8	1.198E-02
9	1.065E-02
10	1.071E-02
11	1.153E-02
12	1.203E-02
13	1.184E-02
14	1.270E-02
15	9.685E-03
16	5.107E-03
17	5.396E-03
18	5.540E-03
19	4.689E-03
20	5.954E-03
21	6.193E-03
22	4.367E-03
23	3.330E-03
24	4.511E-03
25	5.787E-03
26	5.838E-03
27	5.847E-03
28	4.197E-03
29	3.455E-03
30	4.604E-03
31	3.809E-03
32	2.617E-03
33	3.245E-03
34	5.835E-03
35	7.199E-03
36	5.620E-03
37	3.893E-03
38	3.313E-03
39	2.983E-03
40	2.369E-03
41	1.949E-03
42	1.733E-03
43	2.866E-03
44	4.904E-03
45	4.194E-03
46	2.886E-03
47	4.084E-03
48	5.077E-03
49	4.192E-03
50	3.344E-03

SPECTRAL ESTIMATES FOR SILL 1 LINE G

-37-

ITEM A

P	WX(P)
0	-----
1	2.405E 01
2	2.761E 00
3	1.296E 00
4	6.264E-01
5	2.741E-01
6	1.579E-01
7	1.290E-01
8	7.999E-02
9	3.755E-02
10	2.126E-02
11	1.836E-02
12	2.173E-02
13	1.874E-02
14	1.608E-02
15	1.791E-02
16	1.915E-02
17	1.858E-02
18	1.466E-02
19	1.503E-02
20	1.496E-02
21	1.066E-02
22	1.032E-02
23	9.479E-03
24	8.905E-03
25	1.032E-02
26	1.046E-02
27	1.253E-02
28	1.309E-02
29	1.105E-02
30	1.301E-02
31	1.293E-02
32	1.013E-02
33	1.229E-02
34	1.227E-02
35	1.101E-02
36	1.210E-02
37	1.250E-02
38	1.455E-02
39	1.439E-02
40	1.191E-02
41	1.003E-02
42	8.425E-03
43	9.439E-03
44	1.121E-02
45	1.077E-02
46	1.017E-02
47	8.973E-03
48	6.466E-03
49	7.605E-03
50	9.717E-03

SPECTRAL ESTIMATES FOR

SILL 2 LINE H

-38-

ITEM A

P	WX(P)
0	-----
1	3.489E 01
2	4.077E 00
3	1.342E 00
4	7.074E-01
5	3.865E-01
6	1.853E-01
7	1.196E-01
8	8.334E-02
9	5.525E-02
10	5.448E-02
11	4.154E-02
12	2.404E-02
13	2.607E-02
14	2.634E-02
15	1.712E-02
16	1.632E-02
17	1.431E-02
18	8.266E-03
19	1.049E-02
20	1.037E-02
21	7.043E-03
22	7.252E-03
23	6.250E-03
24	5.936E-03
25	8.731E-03
26	8.323E-03
27	7.559E-03
28	9.244E-03
29	6.715E-03
30	4.445E-03
31	4.353E-03
32	3.243E-03
33	6.118E-03
34	9.188E-03
35	5.945E-03
36	4.628E-03
37	6.348E-03
38	5.319E-03
39	6.480E-03
40	8.311E-03
41	5.677E-03
42	5.104E-03
43	6.289E-03
44	4.532E-03
45	4.892E-03
46	5.807E-03
47	5.060E-03
48	6.900E-03
49	6.405E-03
50	4.085E-03

SPECTRAL ESTIMATES FOR

SILL 3 LINE J 2 TRACK -39-

ITEM A WITH ITEM B

P	WX(P)	WY(P)	WC(P)	WQ(P)
0	----	-----	-----	-----
1	6.952E-01	3.442E-01	2.549E-01	4.647E-02
2	6.791E-02	5.308E-02	1.405E-03	1.532E-02
3	3.980E-02	2.693E-02	1.721E-03	5.795E-03
4	3.300E-02	2.133E-02	5.117E-03	3.269E-03
5	1.926E-02	1.259E-02	2.112E-03	2.695E-03
6	9.251E-03	7.634E-03	1.121E-03	1.155E-03
7	7.337E-03	1.391E-02	2.285E-03	-2.079E-03
8	9.890E-03	1.841E-02	1.476E-03	-3.354E-03
9	1.237E-02	1.314E-02	-7.704E-05	-1.531E-03
10	1.320E-02	9.343E-03	-2.552E-03	1.134E-03
11	1.409E-02	1.060E-02	-3.321E-03	1.591E-03
12	1.322E-02	1.251E-02	1.703E-04	-4.963E-04
13	1.420E-02	1.371E-02	1.211E-03	-2.805E-03
14	1.822E-02	1.407E-02	-2.861E-03	-3.105E-03
15	1.582E-02	1.202E-02	-4.394E-03	-1.178E-03
16	9.434E-03	7.609E-03	-3.099E-03	3.777E-04
17	8.507E-03	5.884E-03	-1.766E-03	-1.760E-04
18	1.021E-02	8.042E-03	1.565E-03	-2.040E-03
19	1.160E-02	1.076E-02	2.859E-03	-3.591E-03
20	1.275E-02	9.573E-03	1.719E-03	-3.181E-03
21	1.094E-02	6.726E-03	2.147E-03	-5.344E-04
22	9.513E-03	7.978E-03	3.028E-03	9.838E-04
23	9.229E-03	8.073E-03	1.777E-03	1.786E-04
24	8.047E-03	5.487E-03	-1.331E-03	-2.861E-05
25	8.402E-03	3.942E-03	-1.326E-03	4.780E-04
26	1.122E-02	4.294E-03	-4.909E-04	1.086E-03
27	1.578E-02	7.513E-03	-3.391E-03	7.769E-04
28	1.464E-02	8.818E-03	-3.845E-03	4.450E-04
29	1.028E-02	6.111E-03	-1.158E-03	7.118E-04
30	9.740E-03	3.748E-03	-1.263E-03	9.056E-04
31	9.486E-03	3.460E-03	-1.410E-03	9.677E-04
32	7.391E-03	4.622E-03	-7.361E-04	2.271E-04
33	4.787E-03	6.866E-03	-5.066E-04	-9.257E-04
34	4.715E-03	9.287E-03	-1.664E-04	-1.236E-03
35	5.857E-03	8.548E-03	-9.511E-05	2.524E-04
36	5.462E-03	5.922E-03	1.991E-04	7.685E-04
37	5.952E-03	4.574E-03	-4.960E-04	-3.255E-04
38	6.030E-03	5.105E-03	-1.631E-03	-8.664E-04
39	5.929E-03	6.479E-03	-1.183E-03	-1.184E-03
40	7.857E-03	7.122E-03	-4.772E-04	-3.805E-04
41	8.236E-03	9.177E-03	-1.598E-03	1.198E-03
42	8.376E-03	9.094E-03	-3.867E-03	1.296E-03
43	8.818E-03	5.224E-03	-2.958E-03	8.852E-04
44	8.387E-03	4.352E-03	6.095E-04	2.863E-04
45	8.888E-03	5.800E-03	1.122E-03	-1.902E-03
46	7.710E-03	7.096E-03	4.686E-04	-3.181E-03
47	6.695E-03	6.508E-03	1.039E-03	-1.709E-03
48	7.919E-03	4.433E-03	-3.506E-04	-8.232E-04
49	7.576E-03	5.131E-03	-8.002E-04	-8.701E-04
50	6.576E-03	6.372E-03	3.021E-04	0.

SPECTRAL ESTIMATES FOR

SILL 4 LINE K 2 TRACK -40-

ITEM A WITH ITEM B

P	WX(P)	WY(P)	WC(P)	WQ(P)
0	----	----	----	----
1	7.638E-01	1.158E 00	8.063E-01	2.484E-02
2	6.560E-02	1.031E-01	5.867E-02	-1.207E-02
3	1.887E-02	4.012E-02	8.732E-03	-7.688E-03
4	2.137E-02	3.356E-02	5.033E-03	2.771E-03
5	2.492E-02	1.638E-02	3.125E-03	2.931E-03
6	2.279E-02	8.262E-03	1.036E-03	-1.511E-03
7	2.054E-02	9.300E-03	1.786E-03	-2.497E-03
8	1.873E-02	1.194E-02	2.574E-03	1.405E-03
9	1.314E-02	1.497E-02	6.365E-04	4.690E-03
10	9.401E-03	1.509E-02	-1.339E-03	2.402E-03
11	7.475E-03	1.559E-02	-2.021E-03	-2.849E-04
12	5.427E-03	1.462E-02	-1.463E-03	-1.450E-03
13	6.817E-03	1.127E-02	2.834E-05	-2.946E-03
14	7.619E-03	1.140E-02	2.268E-04	-1.336E-03
15	6.564E-03	1.037E-02	8.631E-04	8.333E-04
16	7.655E-03	7.413E-03	1.545E-03	3.287E-04
17	8.933E-03	8.067E-03	-7.799E-04	1.089E-03
18	9.797E-03	8.906E-03	-1.387E-03	3.145E-03
19	1.009E-02	7.751E-03	-5.787E-05	3.520E-03
20	7.135E-03	6.901E-03	-1.256E-03	2.503E-03
21	5.074E-03	6.328E-03	-2.304E-03	6.229E-04
22	7.739E-03	6.211E-03	-8.474E-04	-1.578E-03
23	1.054E-02	6.790E-03	7.669E-04	-2.783E-03
24	1.021E-02	6.711E-03	8.139E-04	-3.687E-03
25	7.901E-03	5.956E-03	1.290E-03	-3.294E-03
26	6.108E-03	4.518E-03	1.790E-03	-1.532E-03
27	7.296E-03	5.857E-03	1.443E-03	-1.072E-03
28	7.935E-03	8.148E-03	5.361E-04	-3.867E-04
29	5.540E-03	5.781E-03	-8.694E-04	8.913E-04
30	5.673E-03	4.227E-03	-6.702E-04	1.144E-03
31	8.589E-03	5.588E-03	4.455E-04	1.105E-04
32	9.075E-03	5.157E-03	1.663E-03	-4.125E-04
33	8.580E-03	3.878E-03	2.808E-03	-2.786E-04
34	9.247E-03	5.307E-03	3.042E-03	-1.332E-03
35	8.514E-03	7.179E-03	2.768E-03	-2.430E-03
36	7.511E-03	8.578E-03	2.678E-03	-2.573E-03
37	8.600E-03	8.905E-03	2.052E-03	-1.576E-03
38	8.658E-03	6.384E-03	6.844E-04	-5.820E-04
39	6.569E-03	6.281E-03	3.020E-04	9.971E-04
40	5.433E-03	8.334E-03	6.153E-04	2.631E-03
41	5.428E-03	7.162E-03	4.444E-04	1.716E-03
42	5.522E-03	5.030E-03	-9.690E-05	3.786E-04
43	5.896E-03	3.665E-03	1.772E-05	-4.448E-04
44	6.516E-03	3.309E-03	4.455E-04	-7.452E-04
45	6.190E-03	5.364E-03	-5.500E-04	4.609E-04
46	4.146E-03	8.488E-03	-1.800E-03	9.644E-04
47	3.157E-03	9.392E-03	-1.925E-03	-3.890E-04
48	4.501E-03	6.192E-03	-1.066E-03	-1.183E-03
49	5.707E-03	4.837E-03	6.694E-05	-5.094E-04
50	5.936E-03	6.134E-03	5.073E-04	0.

SPECTRAL ESTIMATES FOR

SILL 1A LINE L 2 TRACK -41-

ITEM A WITH ITEM B

P	WX(P)	WY(P)	WC(P)	WQ(P)
0	----	----	----	----
1	6.735E 00	8.070E 00	6.607E 00	-2.643E 00
2	7.210E-01	1.204E 00	7.134E-01	-1.858E-01
3	1.890E-01	2.674E-01	1.354E-01	-1.732E-02
4	9.047E-02	6.703E-02	4.140E-02	-1.641E-02
5	5.561E-02	2.662E-02	2.094E-02	-3.908E-03
6	4.214E-02	1.929E-02	1.564E-02	9.358E-04
7	3.746E-02	1.888E-02	9.838E-03	5.569E-04
8	2.956E-02	2.523E-02	5.596E-03	-7.549E-05
9	2.193E-02	3.507E-02	9.065E-03	-4.137E-03
10	2.631E-02	3.198E-02	9.400E-03	-2.153E-03
11	2.663E-02	2.438E-02	2.013E-03	1.969E-03
12	1.749E-02	2.873E-02	-3.968E-03	3.858E-03
13	1.855E-02	2.932E-02	-2.944E-03	5.267E-03
14	2.548E-02	2.244E-02	2.517E-03	7.433E-03
15	2.775E-02	2.843E-02	6.566E-03	8.545E-03
16	2.493E-02	3.475E-02	6.573E-03	1.278E-03
17	1.831E-02	2.855E-02	2.627E-03	-2.410E-03
18	1.509E-02	2.391E-02	-3.218E-03	1.145E-03
19	1.438E-02	2.135E-02	-3.810E-03	-8.075E-04
20	1.449E-02	1.964E-02	-9.209E-04	-2.679E-04
21	2.085E-02	1.950E-02	-4.335E-03	2.817E-03
22	2.775E-02	1.671E-02	-7.538E-03	-2.100E-03
23	2.604E-02	1.458E-02	-4.962E-03	-4.058E-03
24	2.283E-02	1.589E-02	-2.146E-03	-1.519E-03
25	1.902E-02	1.532E-02	-4.345E-04	-4.556E-03
26	1.159E-02	1.400E-02	-4.435E-04	-3.757E-03
27	1.077E-02	1.736E-02	5.927E-04	2.510E-03
28	1.651E-02	1.582E-02	2.479E-03	4.818E-03
29	1.879E-02	1.010E-02	2.409E-03	3.423E-03
30	1.502E-02	1.086E-02	1.229E-03	2.314E-04
31	1.531E-02	1.133E-02	-2.753E-03	-1.952E-03
32	2.181E-02	1.629E-02	-2.071E-03	4.557E-03
33	1.914E-02	2.846E-02	4.641E-03	7.914E-03
34	8.986E-03	2.826E-02	5.591E-03	2.533E-03
35	7.553E-03	2.419E-02	2.976E-03	2.767E-04
36	1.103E-02	2.297E-02	-1.142E-04	1.252E-04
37	1.368E-02	1.545E-02	-2.791E-04	2.897E-04
38	1.729E-02	1.094E-02	3.241E-03	1.427E-03
39	1.597E-02	1.099E-02	2.937E-03	1.936E-03
40	9.981E-03	8.030E-03	1.292E-03	1.866E-03
41	7.972E-03	7.584E-03	1.744E-03	2.965E-03
42	1.121E-02	1.254E-02	9.426E-04	4.684E-03
43	1.414E-02	1.548E-02	-1.535E-04	3.775E-03
44	1.202E-02	1.916E-02	3.373E-03	6.307E-04
45	1.058E-02	2.470E-02	7.836E-03	-1.144E-03
46	1.377E-02	2.060E-02	4.600E-03	5.401E-04
47	1.528E-02	1.308E-02	5.617E-04	1.637E-03
48	1.414E-02	1.760E-02	1.554E-03	-6.991E-04
49	1.391E-02	2.838E-02	4.402E-04	-1.950E-03
50	1.432E-02	3.303E-02	-1.289E-03	0.

SPECTRAL ESTIMATES FOR

SILL 2A LINE 1 TRK M -42-

ITEM A

P	WX(P)
0	-----
1	2.546E-01
2	2.043E-02
3	1.063E-02
4	7.964E-03
5	5.857E-03
6	4.677E-03
7	3.856E-03
8	3.767E-03
9	3.413E-03
10	2.494E-03
11	1.987E-03
12	1.957E-03
13	2.420E-03
14	2.553E-03
15	1.692E-03
16	1.325E-03
17	1.815E-03
18	1.821E-03
19	1.444E-03
20	1.327E-03
21	1.299E-03
22	1.251E-03
23	1.000E-03
24	8.265E-04
25	1.087E-03
26	1.105E-03
27	9.580E-04
28	8.899E-04
29	6.888E-04
30	6.761E-04
31	7.910E-04
32	7.827E-04
33	8.633E-04
34	9.906E-04
35	1.120E-03
36	1.045E-03
37	7.976E-04
38	8.580E-04
39	7.903E-04
40	4.961E-04
41	4.901E-04
42	6.271E-04
43	6.490E-04
44	6.411E-04
45	5.758E-04
46	3.677E-04
47	3.079E-04
48	3.832E-04
49	5.823E-04
50	7.716E-04

SPECTRAL ESTIMATES FOR HOOD 1 LINE N -43-

ITEM A

P	WX(P)
0	
1	3.876E 00
2	1.138E 00
3	3.470E-01
4	8.701E-02
5	2.371E-02
6	1.104E-02
7	1.049E-02
8	1.139E-02
9	1.304E-02
10	1.558E-02
11	1.295E-02
12	7.419E-03
13	5.910E-03
14	6.767E-03
15	6.680E-03
16	5.441E-03
17	4.473E-03
18	5.409E-03
19	6.756E-03
20	6.375E-03
21	4.524E-03
22	3.482E-03
23	3.830E-03
24	4.104E-03
25	4.871E-03
26	6.377E-03
27	6.295E-03
28	4.917E-03
29	4.209E-03
30	3.631E-03
31	3.204E-03
32	4.137E-03
33	5.626E-03
34	7.015E-03
35	8.010E-03
36	5.707E-03
37	4.472E-03
38	5.973E-03
39	5.967E-03
40	7.327E-03
41	7.776E-03
42	5.365E-03
43	4.556E-03
44	5.015E-03
45	5.803E-03
46	5.830E-03
47	4.188E-03
48	3.228E-03
49	3.445E-03
50	3.556E-03

SPECTRAL ESTIMATES FOR

HOOD 2 LINE 0

-44-

ITEM A

P	WX(P)
0	-----
1	5.103E-01
2	6.514E-02
3	2.797E-02
4	1.971E-02
5	1.201E-02
6	6.580E-03
7	6.232E-03
8	7.694E-03
9	8.985E-03
10	1.129E-02
11	1.423E-02
12	1.763E-02
13	1.920E-02
14	1.598E-02
15	1.072E-02
16	6.966E-03
17	4.266E-03
18	2.297E-03
19	1.824E-03
20	2.131E-03
21	2.761E-03
22	3.380E-03
23	3.214E-03
24	2.596E-03
25	1.87E-03
26	1.706E-03
27	2.057E-03
28	1.663E-03
29	1.251E-03
30	1.117E-03
31	8.391E-04
32	8.855E-04
33	1.350E-03
34	1.879E-03
35	2.015E-03
36	2.085E-03
37	2.341E-03
38	2.101E-03
39	1.915E-03
40	2.167E-03
41	2.101E-03
42	1.715E-03
43	1.667E-03
44	1.838E-03
45	1.629E-03
46	1.423E-03
47	1.314E-03
48	1.092E-03
49	1.206E-03
50	1.415E-03

SPECTRAL ESTIMATES FOR

POLK 1 LINE P

-45-

ITEM A

P	WX(P)
0	----
1	5.966E 00
2	7.111E-01
3	4.693E-01
4	2.892E-01
5	1.555E-01
6	9.170E-02
7	6.343E-02
8	5.137E-02
9	5.256E-02
10	5.533E-02
11	5.101E-02
12	5.379E-02
13	5.920E-02
14	5.263E-02
15	4.841E-02
16	5.835E-02
17	6.054E-02
18	4.147E-02
19	3.281E-02
20	4.090E-02
21	4.187E-02
22	3.468E-02
23	2.616E-02
24	2.228E-02
25	1.787E-02
26	1.110E-02
27	9.468E-03
28	1.080E-02
29	1.191E-02
30	1.365E-02
31	1.614E-02
32	1.815E-02
33	1.755E-02
34	1.668E-02
35	1.458E-02
36	9.763E-03
37	6.975E-03
38	7.800E-03
39	8.930E-03
40	7.545E-03
41	5.710E-03
42	5.646E-03
43	5.583E-03
44	5.628E-03
45	5.972E-03
46	4.953E-03
47	3.265E-03
48	3.684E-03
49	6.266E-03
50	7.771E-03

SPECTRAL ESTIMATES FOR

POLK 2 LINE Q

-48-

ITEM A

P	WX(P)
0	-----
1	8.006E 01
2	9.443E 00
3	3.610E 00
4	1.473E 00
5	1.169E 00
6	1.202E 00
7	8.202E-01
8	4.226E-01
9	2.274E-01
10	1.171E-01
11	6.953E-02
12	8.722E-02
13	1.097E-01
14	8.112E-02
15	8.318E-02
16	1.570E-01
17	1.518E-01
18	7.988E-02
19	9.450E-02
20	1.282E-01
21	8.606E-02
22	5.780E-02
23	5.860E-02
24	4.296E-02
25	4.932E-02
26	6.210E-02
27	4.751E-02
28	3.146E-02
29	3.371E-02
30	4.429E-02
31	5.382E-02
32	4.898E-02
33	3.489E-02
34	2.461E-02
35	1.987E-02
36	2.003E-02
37	1.984E-02
38	1.959E-02
39	1.573E-02
40	8.489E-03
41	6.527E-03
42	1.219E-02
43	2.114E-02
44	2.036E-02
45	1.108E-02
46	8.019E-03
47	1.093E-02
48	1.153E-02
49	1.114E-02
50	1.208E-02

SPECTRAL ESTIMATES FOR

BENNING 1 LINE R

-47-

ITEM A

P	WX(P)
0	
1	6.135E 00
2	1.328E 00
3	6.736E-01
4	2.855E-01
5	1.328E-01
6	1.204E-01
7	9.200E-02
8	4.219E-02
9	3.108E-02
10	4.639E-02
11	4.549E-02
12	3.441E-02
13	3.159E-02
14	3.600E-02
15	3.629E-02
16	2.554E-02
17	1.489E-02
18	1.124E-02
19	1.256E-02
20	1.647E-02
21	1.791E-02
22	1.718E-02
23	1.626E-02
24	1.359E-02
25	1.070E-02
26	8.959E-03
27	8.736E-03
28	1.179E-02
29	1.332E-02
30	1.185E-02
31	1.020E-02
32	7.746E-03
33	9.297E-03
34	1.425E-02
35	1.458E-02
36	1.241E-02
37	9.952E-03
38	7.330E-03
39	5.136E-03
40	3.967E-03
41	5.548E-03
42	8.075E-03
43	1.010E-02
44	1.301E-02
45	1.433E-02
46	1.169E-02
47	9.461E-03
48	7.717E-03
49	5.603E-03
50	4.974E-03

SPECTRAL ESTIMATES FOR BENNING 2 LINE S -48-

ITEM A

P	WX(P)
0	-----
1	1.145E 00
2	1.566E-01
3	1.145E-01
4	1.449E-01
5	1.522E-01
6	1.102E-01
7	6.686E-02
8	4.708E-02
9	3.425E-02
10	2.275E-02
11	1.723E-02
12	1.556E-02
13	1.742E-02
14	1.936E-02
15	1.369E-02
16	8.478E-03
17	1.186E-02
18	1.583E-02
19	1.373E-02
20	1.160E-02
21	1.476E-02
22	1.692E-02
23	1.650E-02
24	1.659E-02
25	1.446E-02
26	1.048E-02
27	1.039E-02
28	1.232E-02
29	1.083E-02
30	8.285E-03
31	8.183E-03
32	7.564E-03
33	9.945E-03
34	1.503E-02
35	1.285E-02
36	7.019E-03
37	4.865E-03
38	5.648E-03
39	8.056E-03
40	9.917E-03
41	8.673E-03
42	6.083E-03
43	5.560E-03
44	5.904E-03
45	5.437E-03
46	5.589E-03
47	6.196E-03
48	6.362E-03
49	5.336E-03
50	4.253E-03

SPECTRAL ESTIMATES FOR

MCCLELLAN 1 LINE T

-49-

ITEM A

P	WX(P)
0	----
1	1.711E 00
2	5.754E-01
3	2.937E-01
4	1.842E-01
5	1.276E-01
6	7.948E-02
7	5.577E-02
8	4.659E-02
9	4.523E-02
10	3.830E-02
11	2.450E-02
12	2.144E-02
13	2.398E-02
14	1.843E-02
15	1.024E-02
16	8.966E-03
17	1.365E-02
18	1.603E-02
19	1.265E-02
20	9.566E-03
21	9.606E-03
22	1.162E-02
23	1.255E-02
24	1.291E-02
25	1.169E-02
26	7.310E-03
27	7.545E-03
28	1.297E-02
29	1.747E-02
30	1.617E-02
31	1.212E-02
32	8.836E-03
33	6.726E-03
34	6.241E-03
35	7.803E-03
36	1.104E-02
37	1.232E-02
38	1.109E-02
39	9.863E-03
40	8.742E-03
41	1.050E-02
42	1.259E-02
43	1.031E-02
44	9.272E-03
45	9.000E-03
46	7.964E-03
47	8.902E-03
48	9.591E-03
49	8.535E-03
50	7.907E-03

SPECTRAL ESTIMATES FOR MCCLELLAN 2 LINE U -50-

ITEM A

P	WX(P)
0	-----
1	8.077E-00
2	1.399E-00
3	6.267E-01
4	3.132E-01
5	1.981E-01
6	1.847E-01
7	1.719E-01
8	1.128E-01
9	5.799E-02
10	5.017E-02
11	5.759E-02
12	4.475E-02
13	3.053E-02
14	3.013E-02
15	2.573E-02
16	1.611E-02
17	1.014E-02
18	8.613E-03
19	8.410E-03
20	9.478E-03
21	1.253E-02
22	1.082E-02
23	8.962E-03
24	1.299E-02
25	1.411E-02
26	9.774E-03
27	8.707E-03
28	8.809E-03
29	7.082E-03
30	7.660E-03
31	7.661E-03
32	4.857E-03
33	3.887E-03
34	5.162E-03
35	4.671E-03
36	2.731E-03
37	2.479E-03
38	4.467E-03
39	5.404E-03
40	4.343E-03
41	3.388E-03
42	2.884E-03
43	3.262E-03
44	4.114E-03
45	4.391E-03
46	4.060E-03
47	4.053E-03
48	4.739E-03
49	4.038E-03
50	3.048E-03

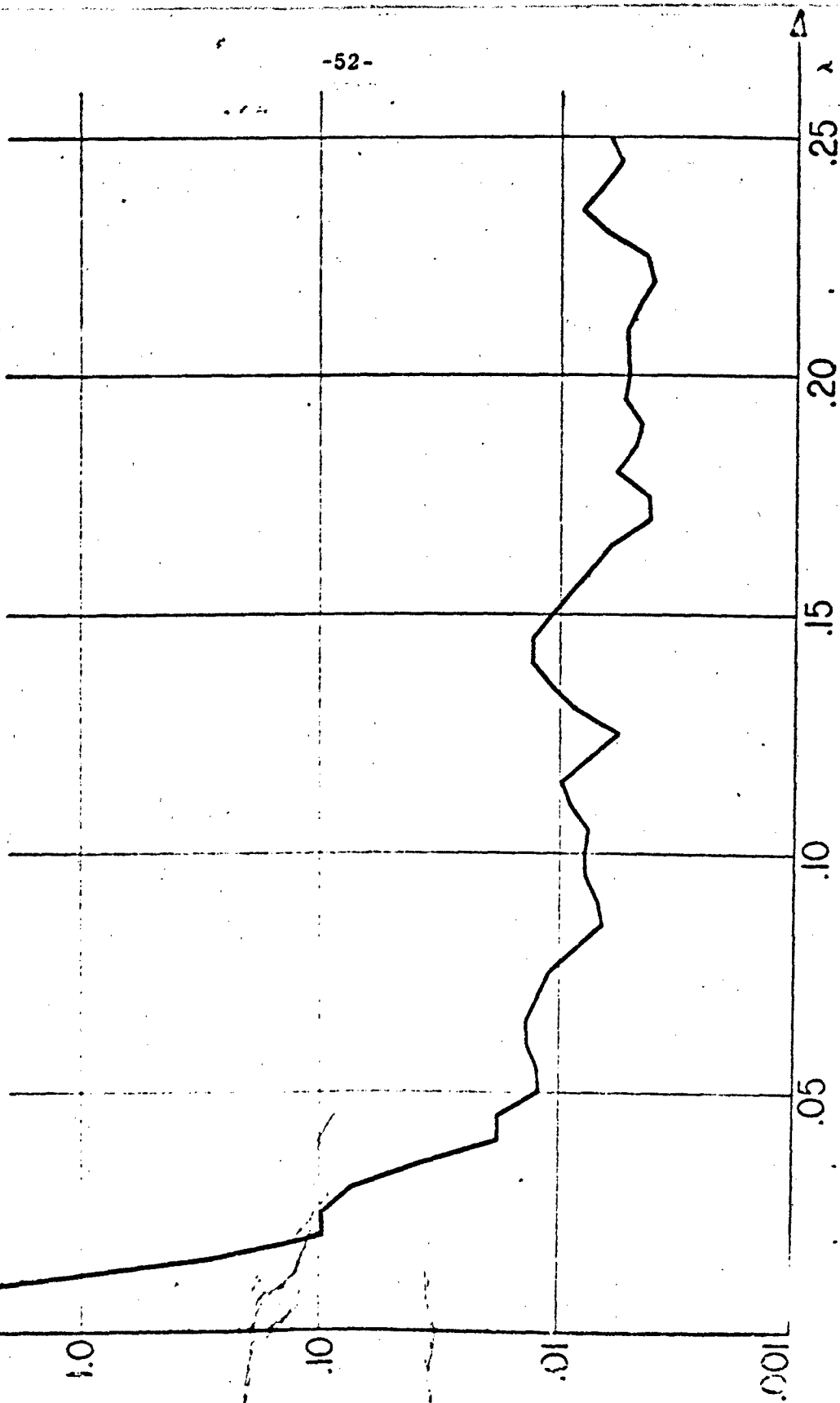
SPECTRAL ESTIMATES FOR NEV 2-TRACK -51-

ITEM A WITH ITEM B

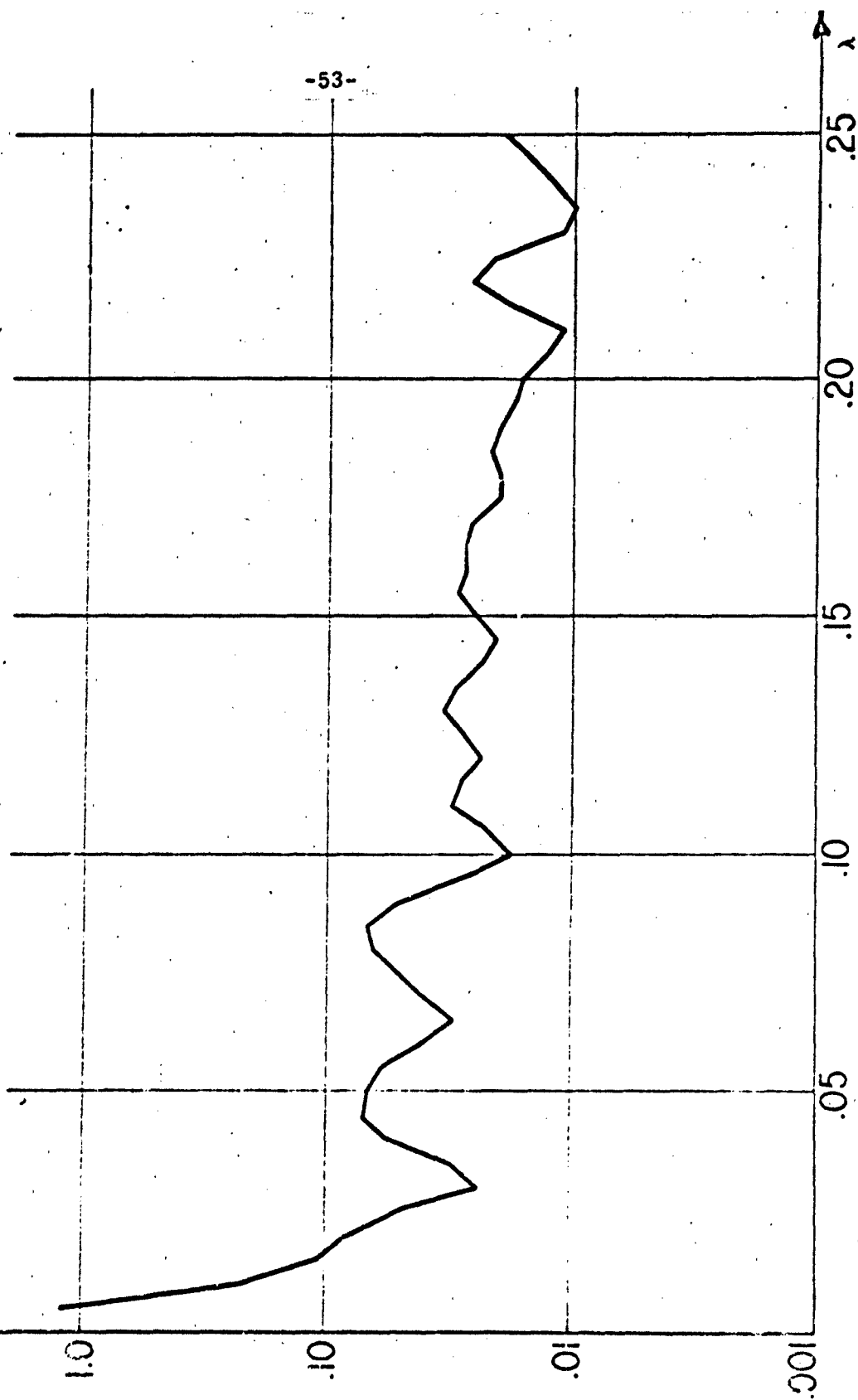
P	WX(P)	WY(P)	WC(P)	WO(P)
0	----	----	----	----
1	2.576E-01	-1.501E-01	3.892E-02	-1.999E-02
2	1.080E-01	2.796E-02	1.249E-02	-8.192E-04
3	8.461E-02	7.627E-02	1.410E-02	1.146E-02
4	6.418E-02	8.182E-02	1.922E-02	1.729E-03
5	3.906E-02	5.331E-02	1.129E-02	-1.348E-03
6	2.470E-02	2.678E-02	1.047E-03	-2.704E-03
7	2.947E-02	2.131E-02	4.175E-03	-7.479E-03
8	3.035E-02	2.713E-02	4.116E-03	-5.792E-03
9	1.941E-02	3.583E-02	-5.550E-03	-1.787E-04
10	1.416E-02	4.250E-02	-1.049E-03	-2.783E-03
11	1.442E-02	3.930E-02	7.805E-03	-5.561E-03
12	1.208E-02	2.603E-02	3.610E-03	-2.152E-03
13	9.760E-03	1.262E-02	-7.072E-04	-1.387E-04
14	8.982E-03	9.557E-03	-1.141E-03	-1.115E-03
15	9.288E-03	1.547E-02	-8.751E-04	-2.514E-04
16	1.279E-02	1.988E-02	2.791E-03	3.554E-03
17	1.503E-02	1.793E-02	3.761E-03	3.123E-03
18	1.119E-02	1.260E-02	-1.007E-04	4.699E-04
19	8.692E-03	8.740E-03	-1.481E-03	2.104E-03
20	1.070E-02	9.586E-03	-1.994E-03	9.929E-05
21	1.198E-02	1.299E-02	-3.177E-03	-4.703E-03
22	1.075E-02	1.559E-02	-2.494E-03	-1.695E-03
23	8.342E-03	1.642E-02	-1.675E-03	2.712E-03
24	7.883E-03	1.218E-02	-1.424E-03	1.334E-04
25	8.124E-03	1.137E-02	-3.852E-04	-3.342E-03
26	7.306E-03	1.711E-02	1.444E-03	-5.010E-03
27	7.526E-03	1.457E-02	8.968E-04	-5.691E-03
28	9.151E-03	8.864E-03	1.038E-05	-2.680E-03
29	9.814E-03	9.117E-03	3.477E-04	-5.262E-04
30	6.958E-03	1.035E-02	6.933E-04	-9.876E-04
31	4.342E-03	8.679E-03	2.428E-04	1.451E-04
32	4.496E-03	4.676E-03	-1.534E-04	2.691E-05
33	5.194E-03	4.288E-03	3.194E-04	-3.071E-04
34	5.263E-03	8.326E-03	2.469E-04	1.034E-03
35	5.838E-03	9.167E-03	-6.932E-04	5.036E-04
36	7.342E-03	7.446E-03	-1.692E-03	-3.582E-04
37	6.516E-03	7.631E-03	-3.773E-04	5.964E-04
38	3.912E-03	8.602E-03	7.847E-04	4.506E-04
39	2.168E-03	9.306E-03	6.980E-05	-6.066E-04
40	1.755E-03	8.534E-03	7.209E-04	-3.686E-04
41	2.461E-03	6.733E-03	1.613E-03	2.408E-04
42	3.697E-03	6.325E-03	1.172E-03	-3.048E-04
43	4.920E-03	7.852E-03	1.442E-04	-1.332E-03
44	4.475E-03	8.889E-03	-5.988E-04	-1.033E-03
45	3.684E-03	7.908E-03	-2.182E-04	-7.413E-04
46	4.293E-03	6.215E-03	7.746E-04	-8.203E-04
47	5.031E-03	5.247E-03	1.168E-03	-5.295E-04
48	5.457E-03	6.735E-03	7.820E-04	-1.038E-04
49	4.709E-03	7.036E-03	1.238E-03	-6.352E-04
50	3.775E-03	5.726E-03	1.932E-03	0.

RILEY IA

-52-



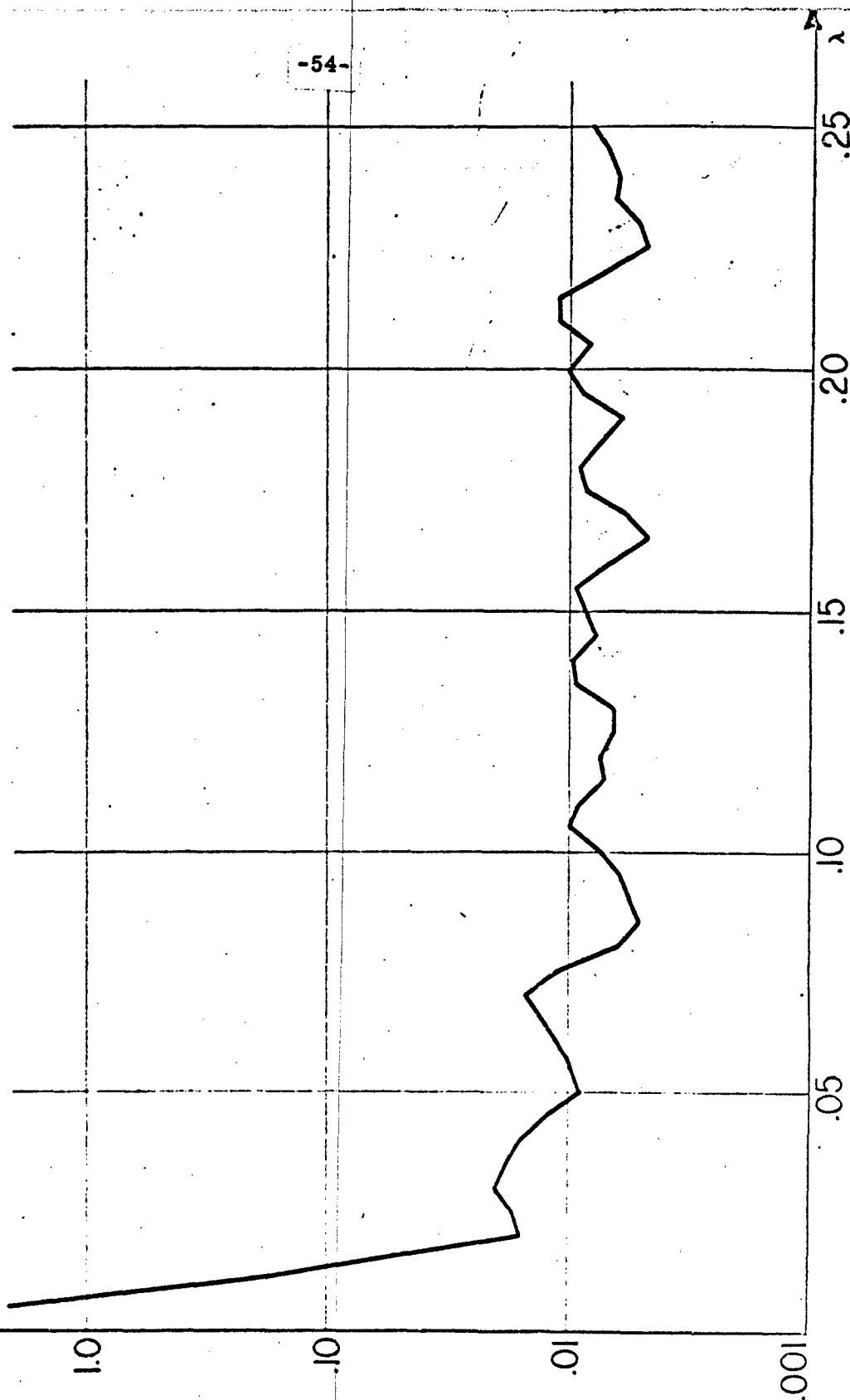
RILEY II B



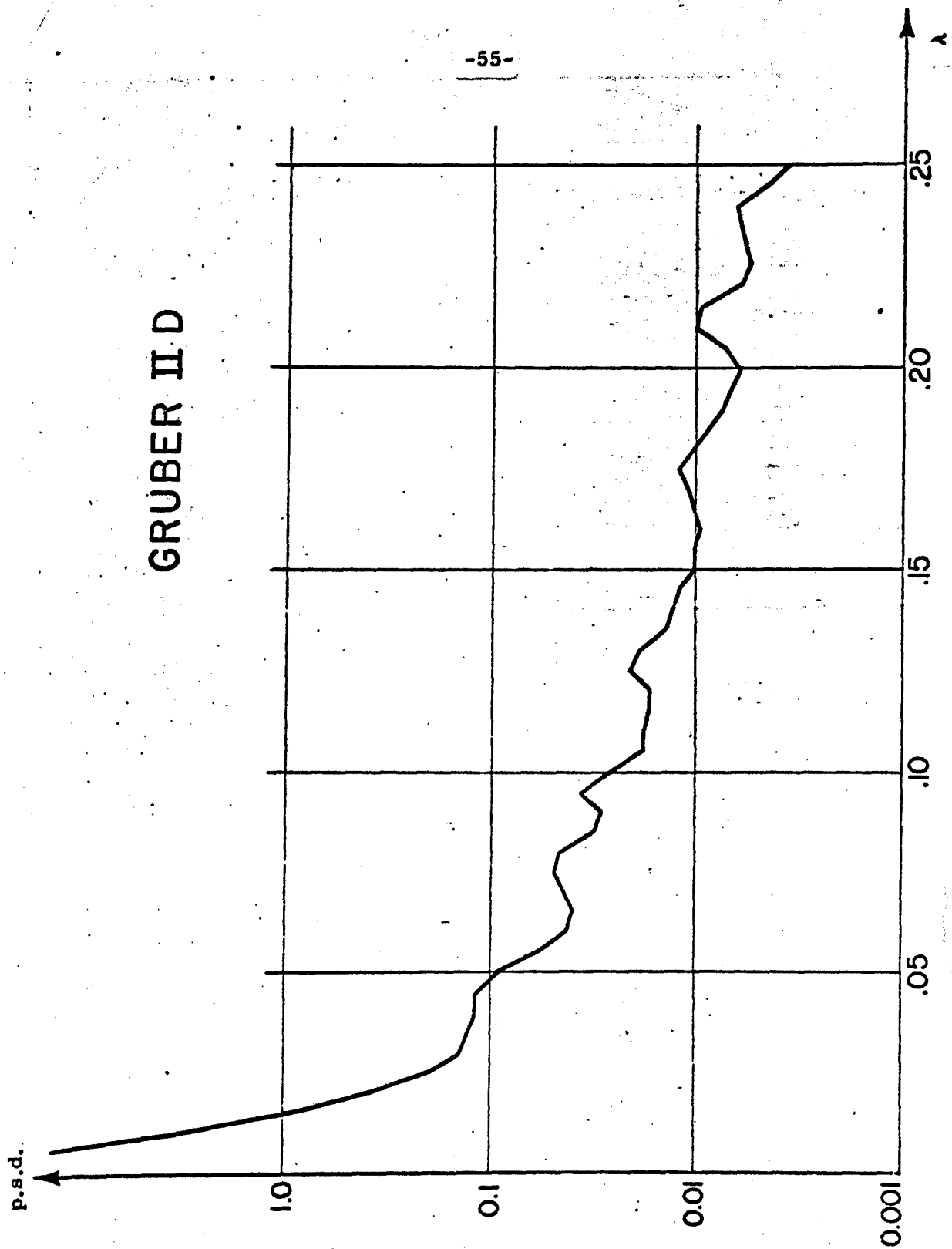
GRUBER IC

p.s.d.

Δ



GRUBER II D



p.s.d.

Δ

CARSON I E

-56-

λ

.25

.20

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.001

1.0

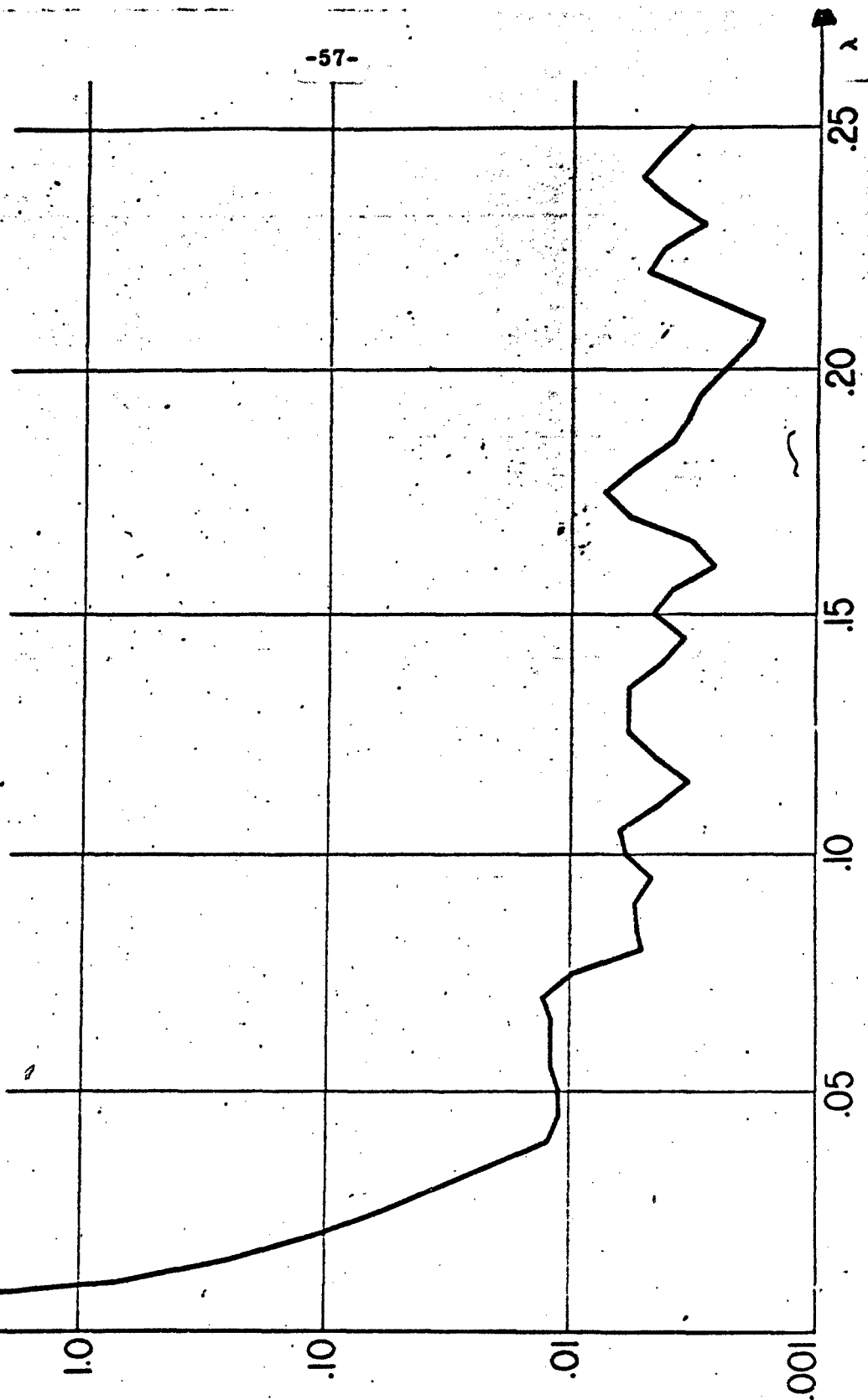
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.01

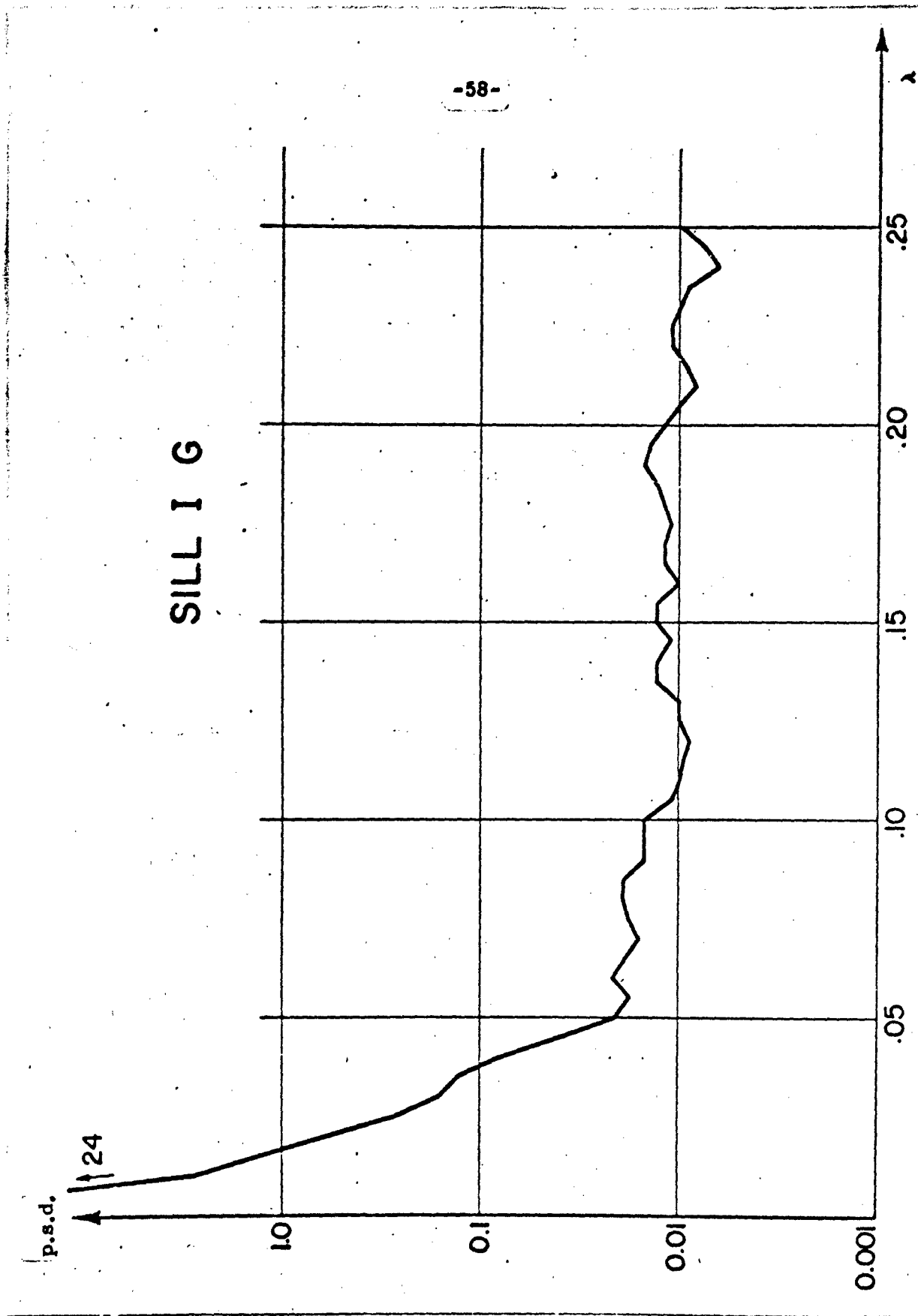
CARSON II-F

p.s.d. —

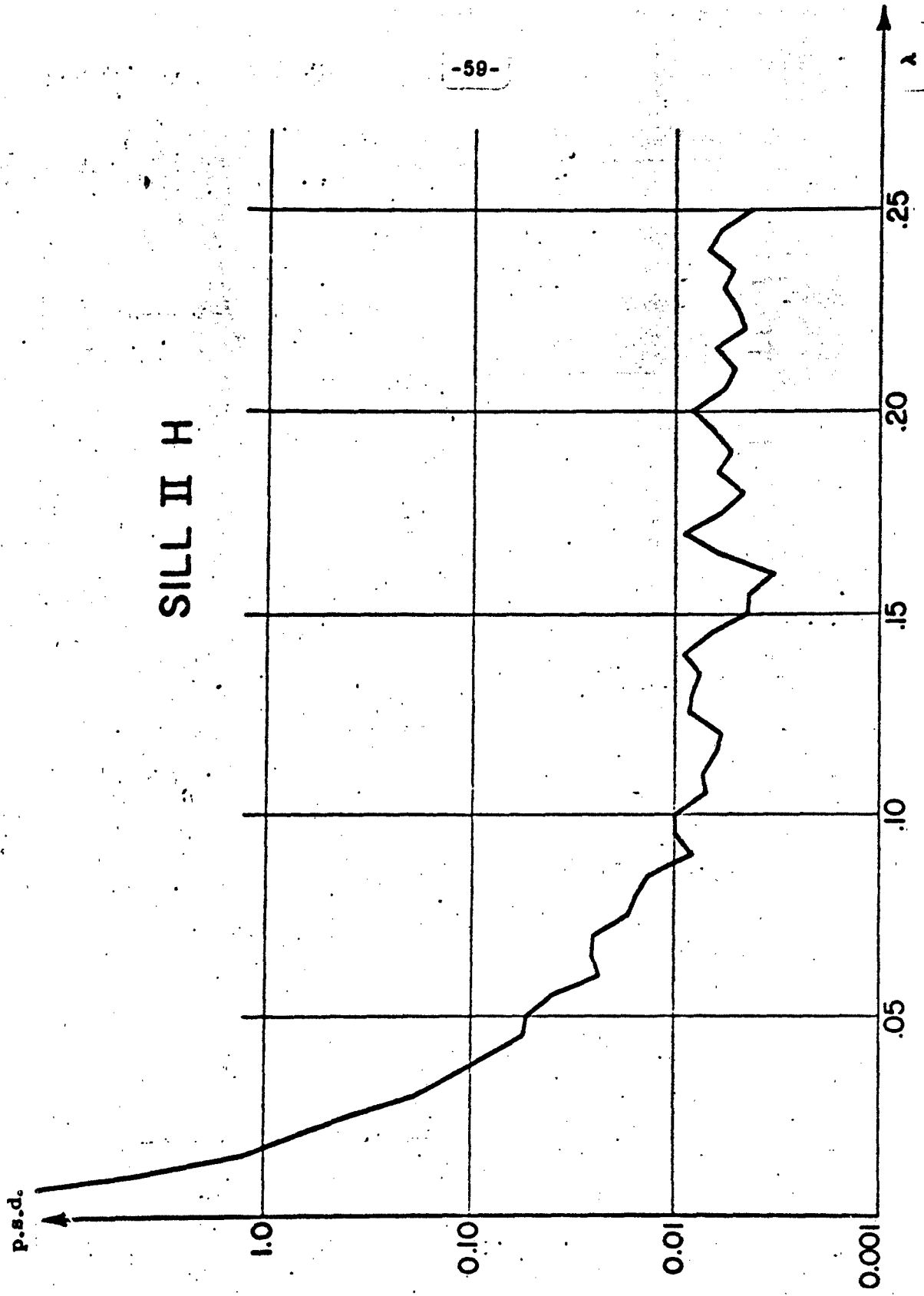
A



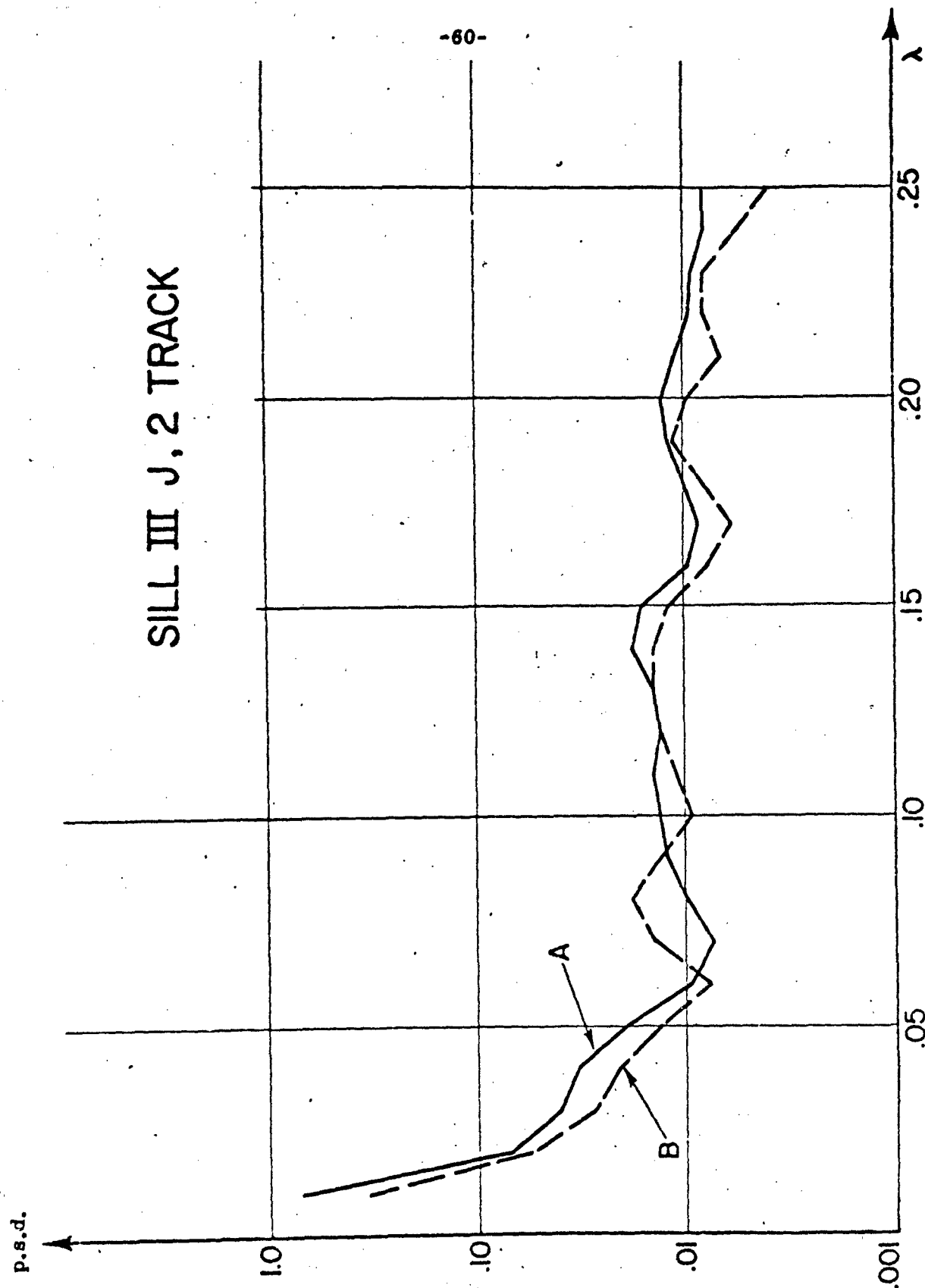
SILL I G



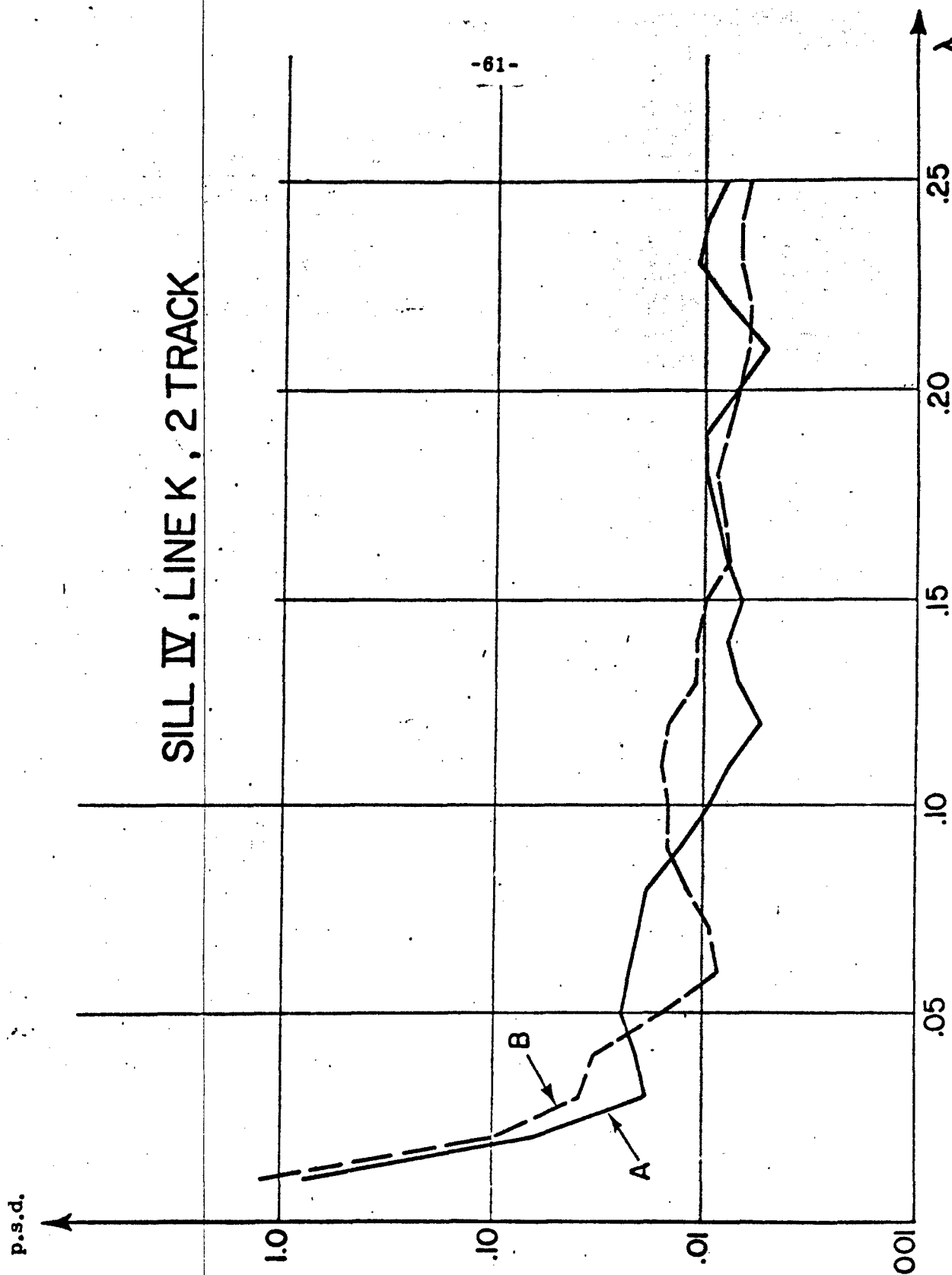
SILL II H



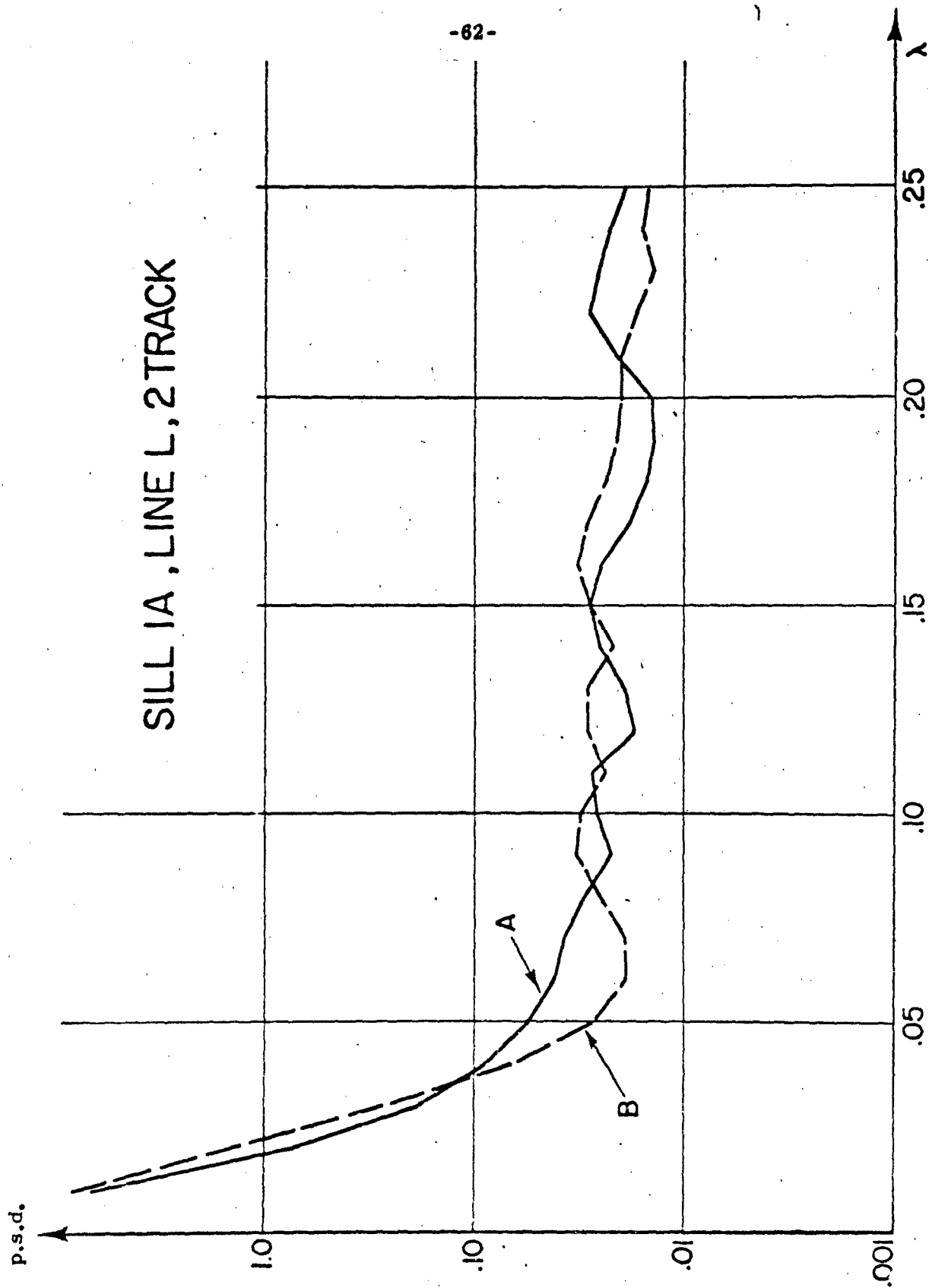
SILL III J, 2 TRACK



SILL IV, LINE K, 2 TRACK



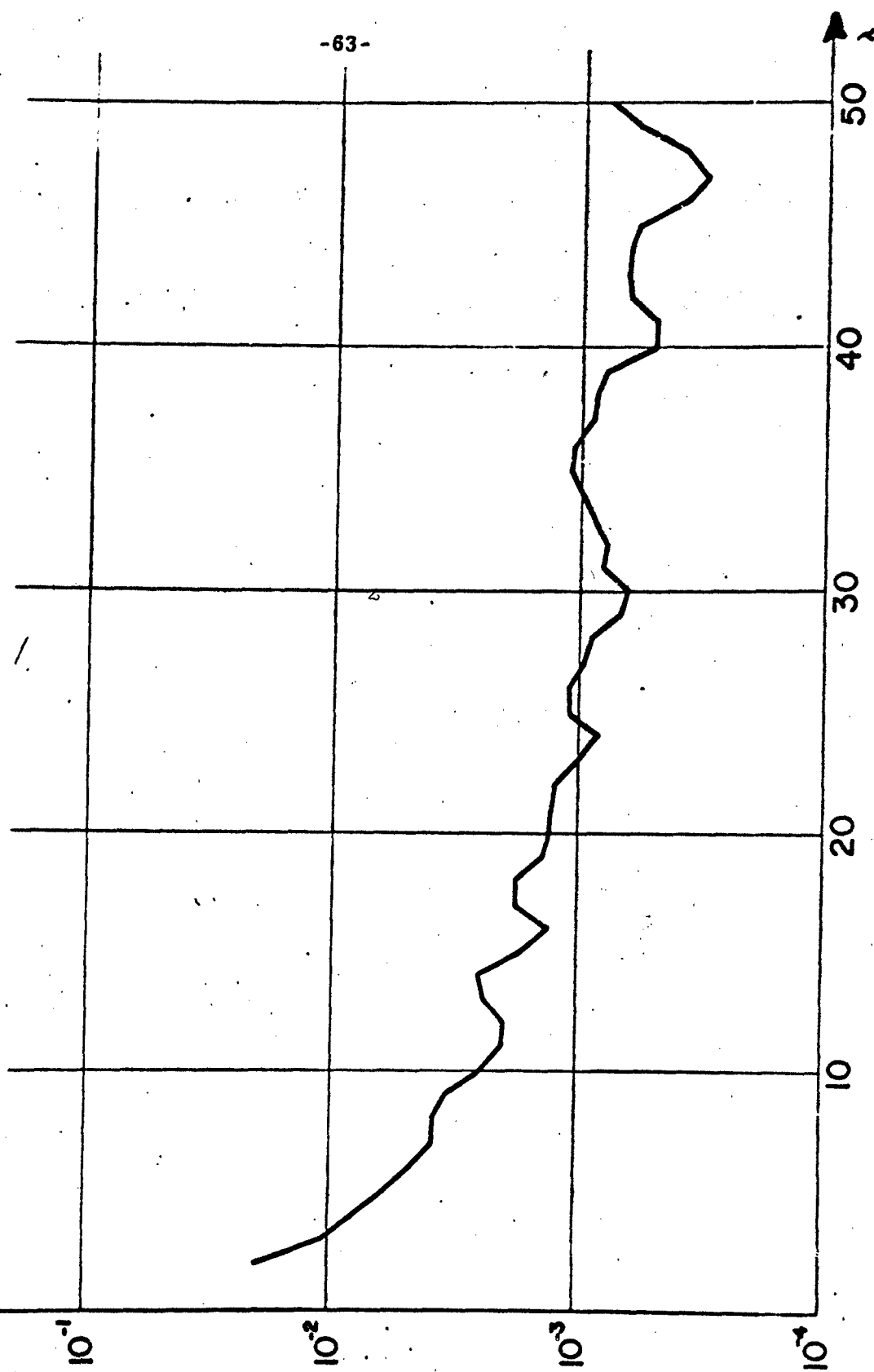
SILL 1A, LINE L, 2 TRACK

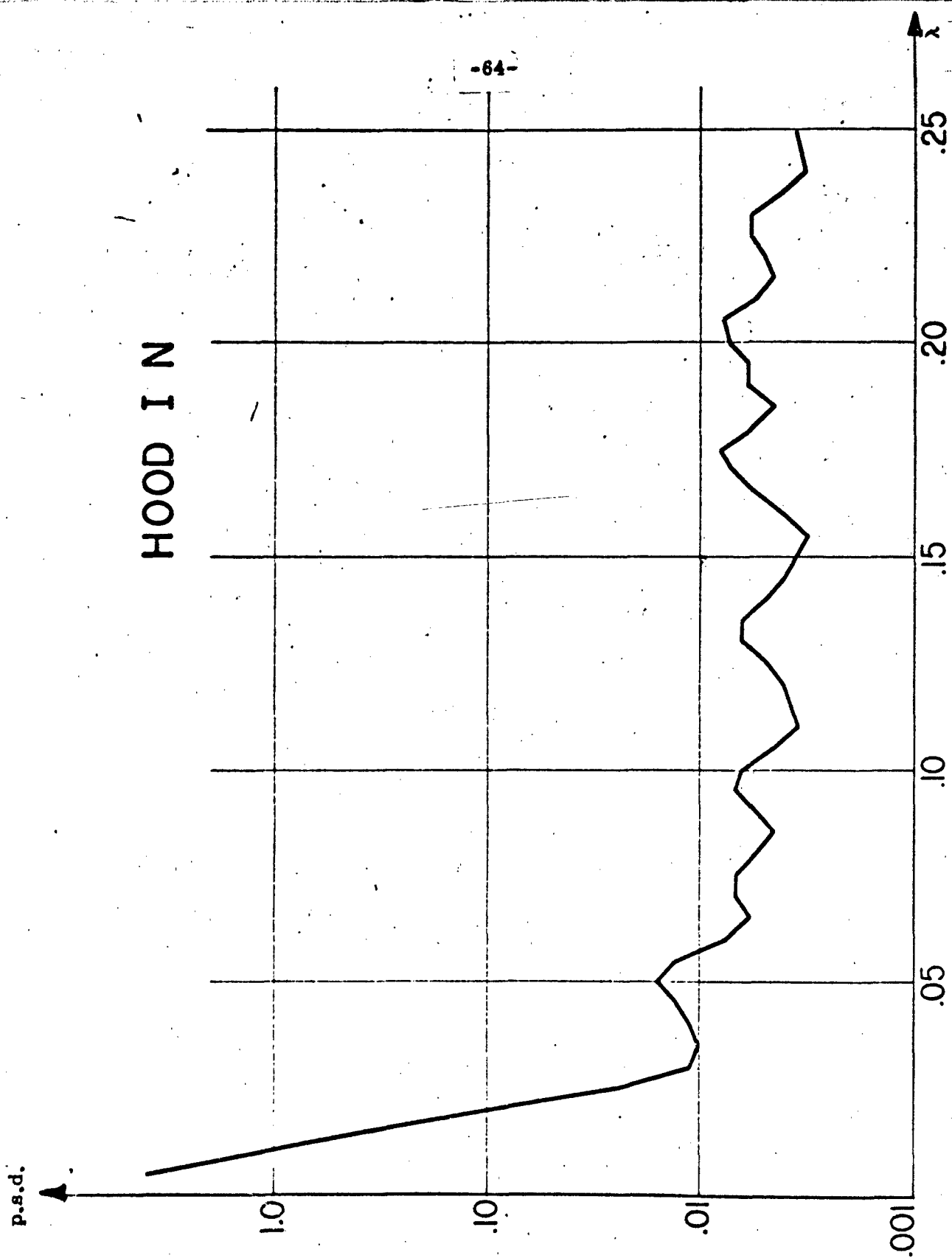


p.s.d.

SILL LINE M

-63-

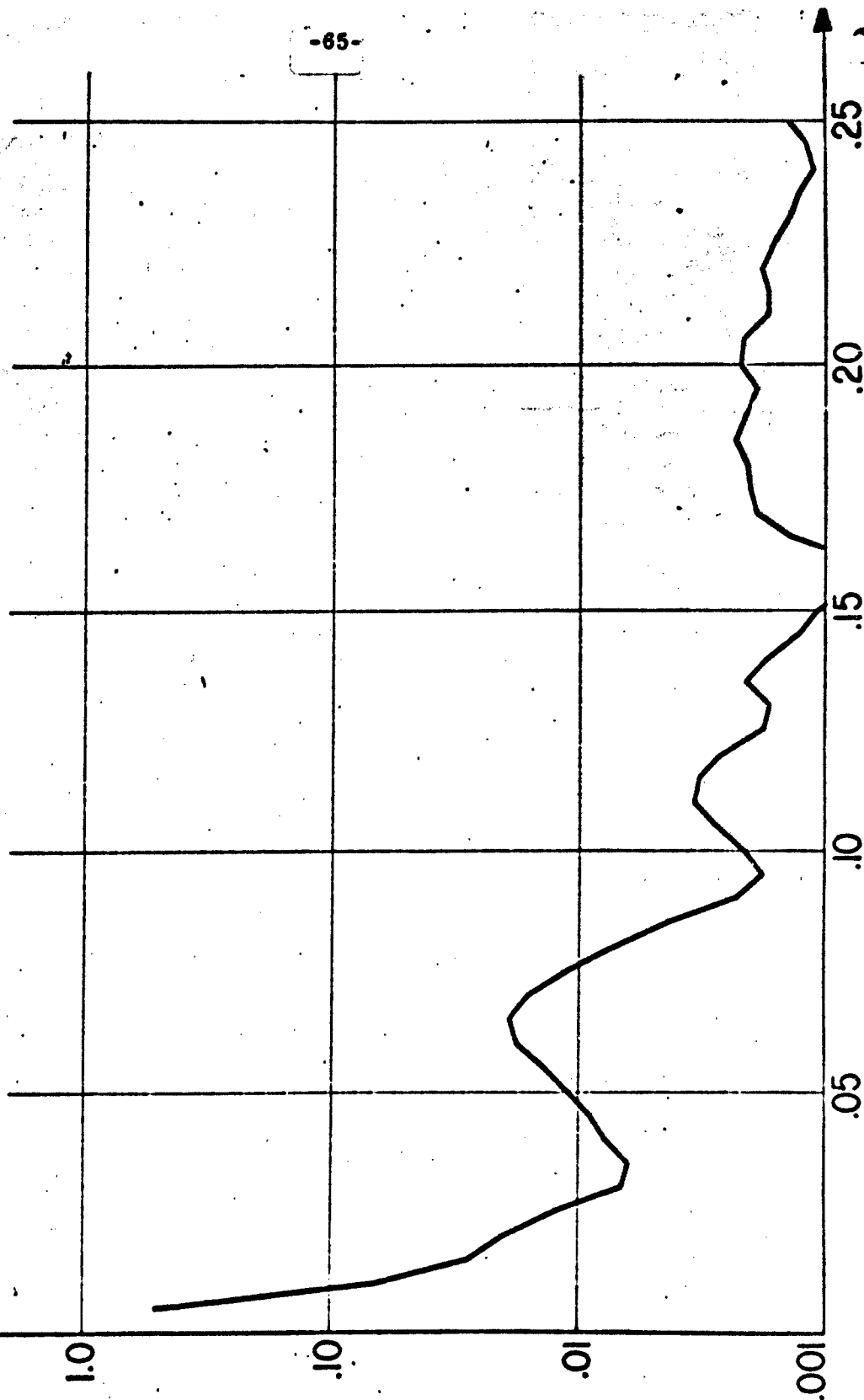


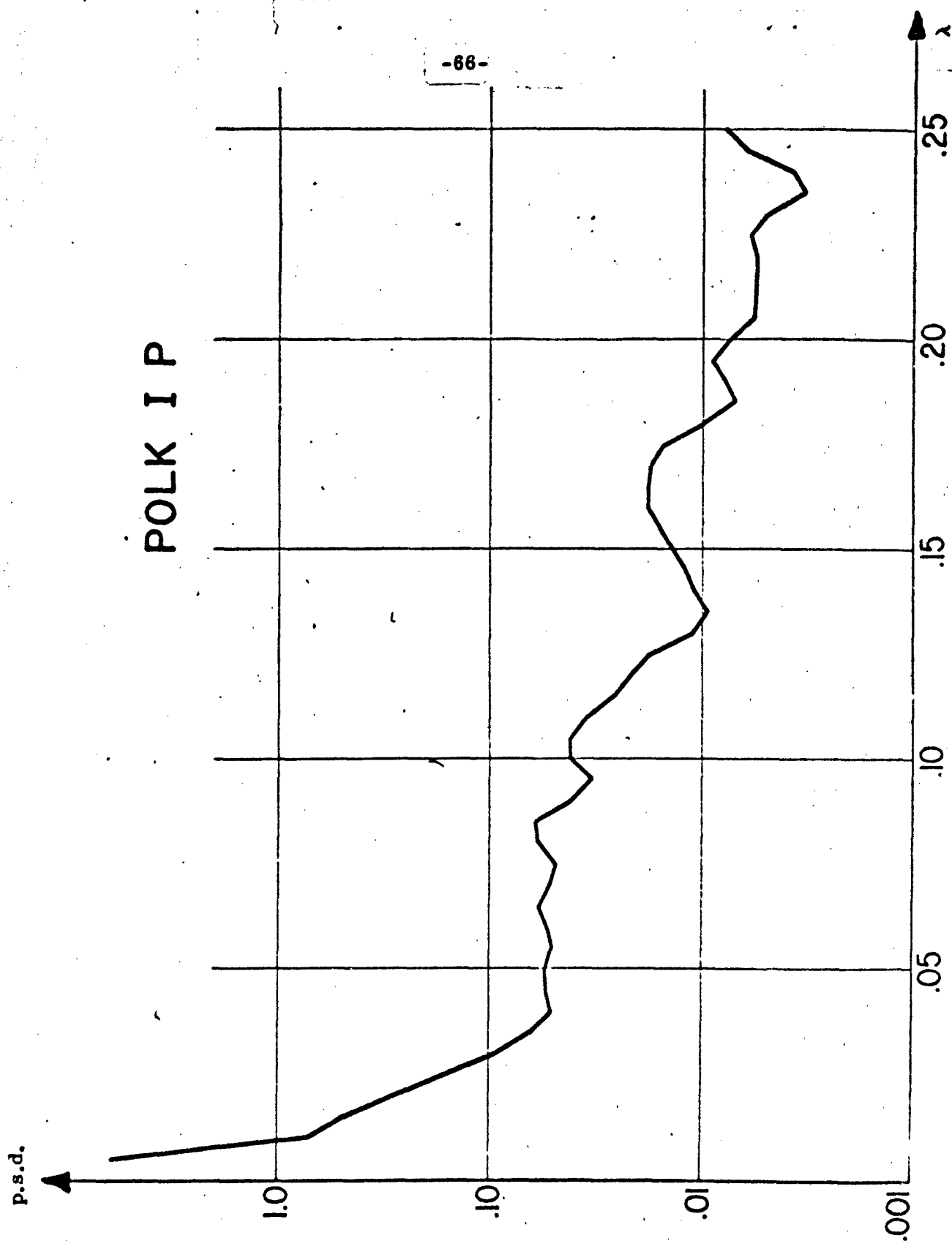


p.s.d.

HOOD II O

-65-





p.s.d.

POLK II Q

-67-

$\Delta \lambda$

.25

.20

.15

.10

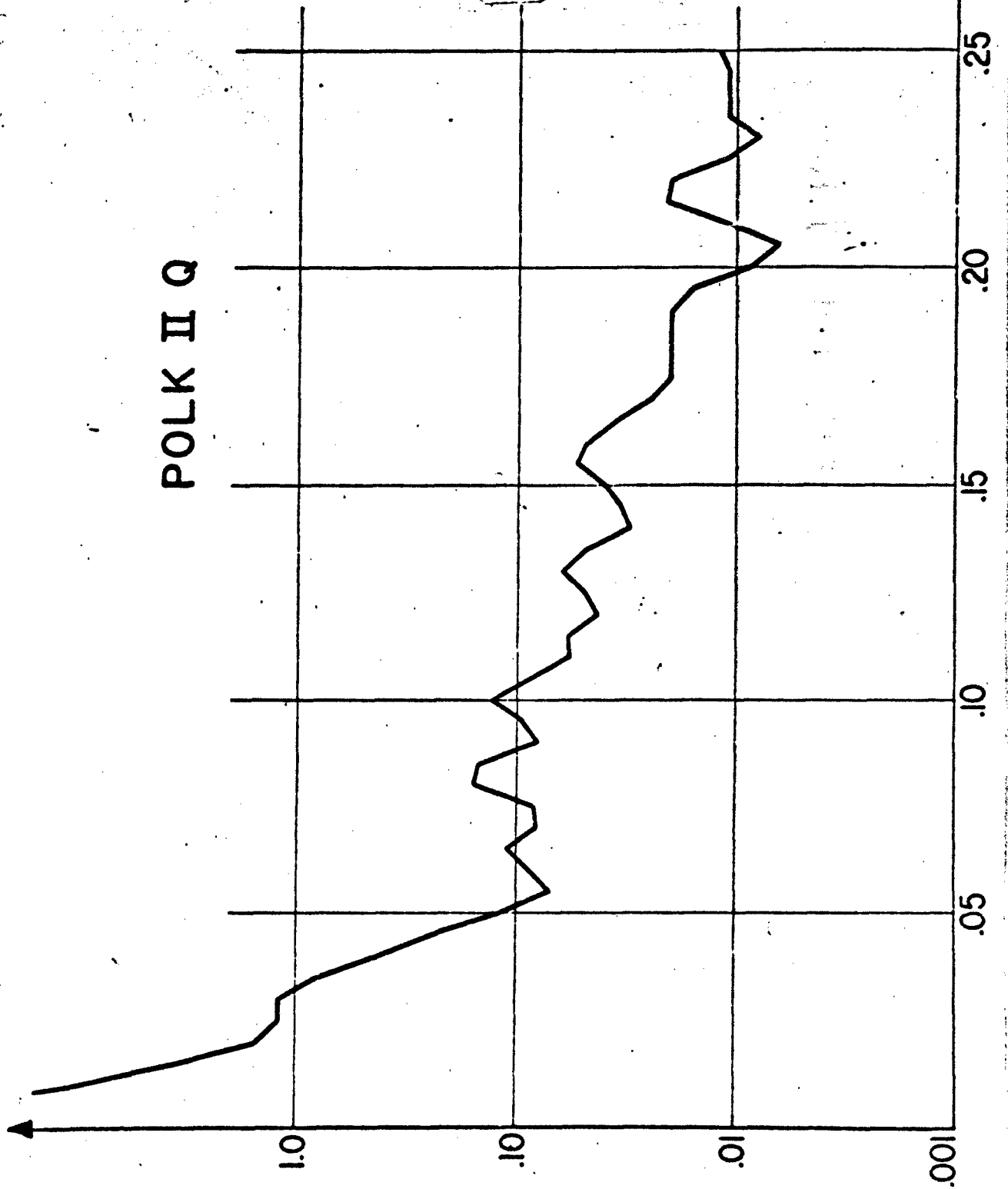
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.001

1.0

.10

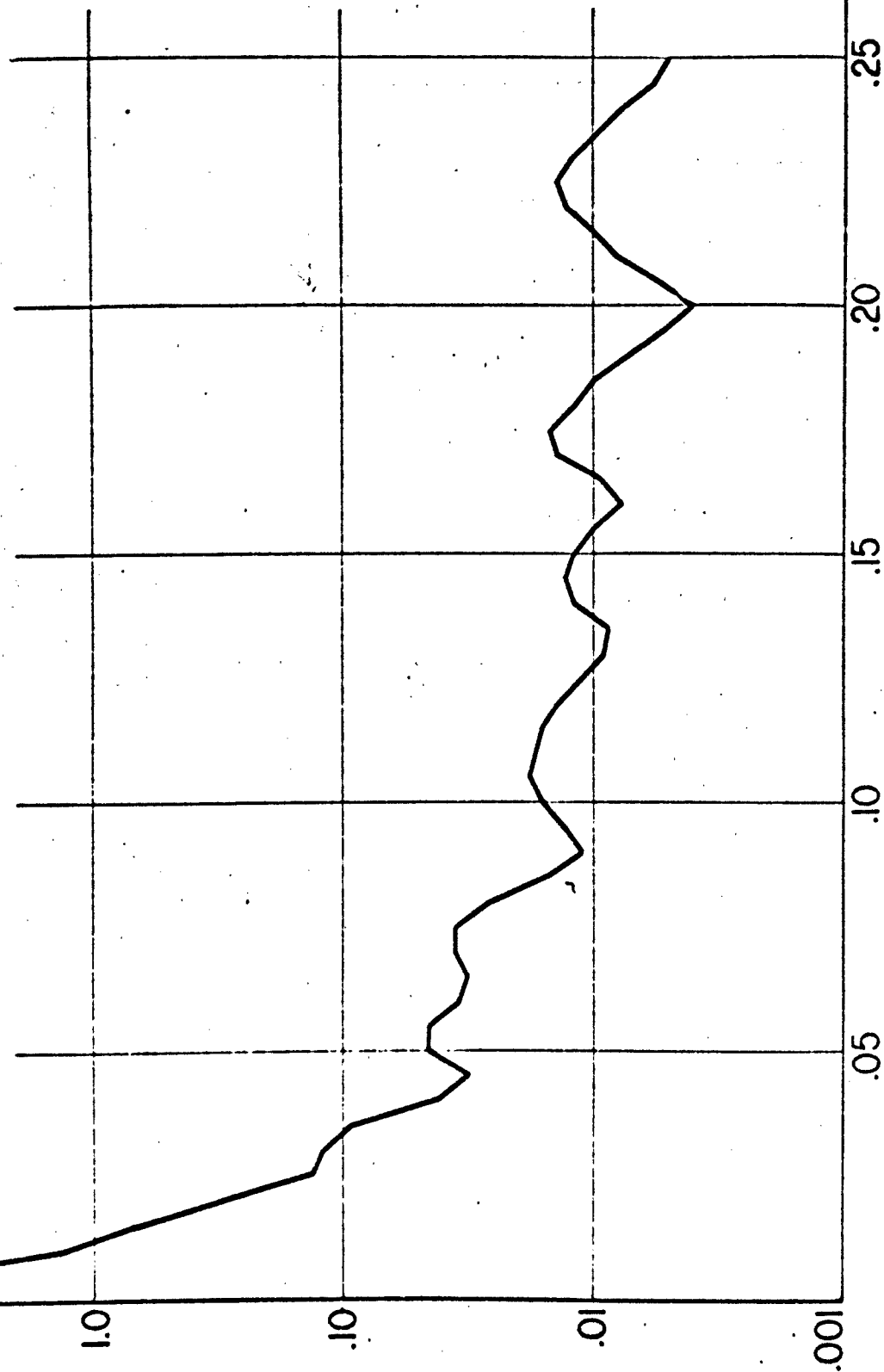
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BENNING I R

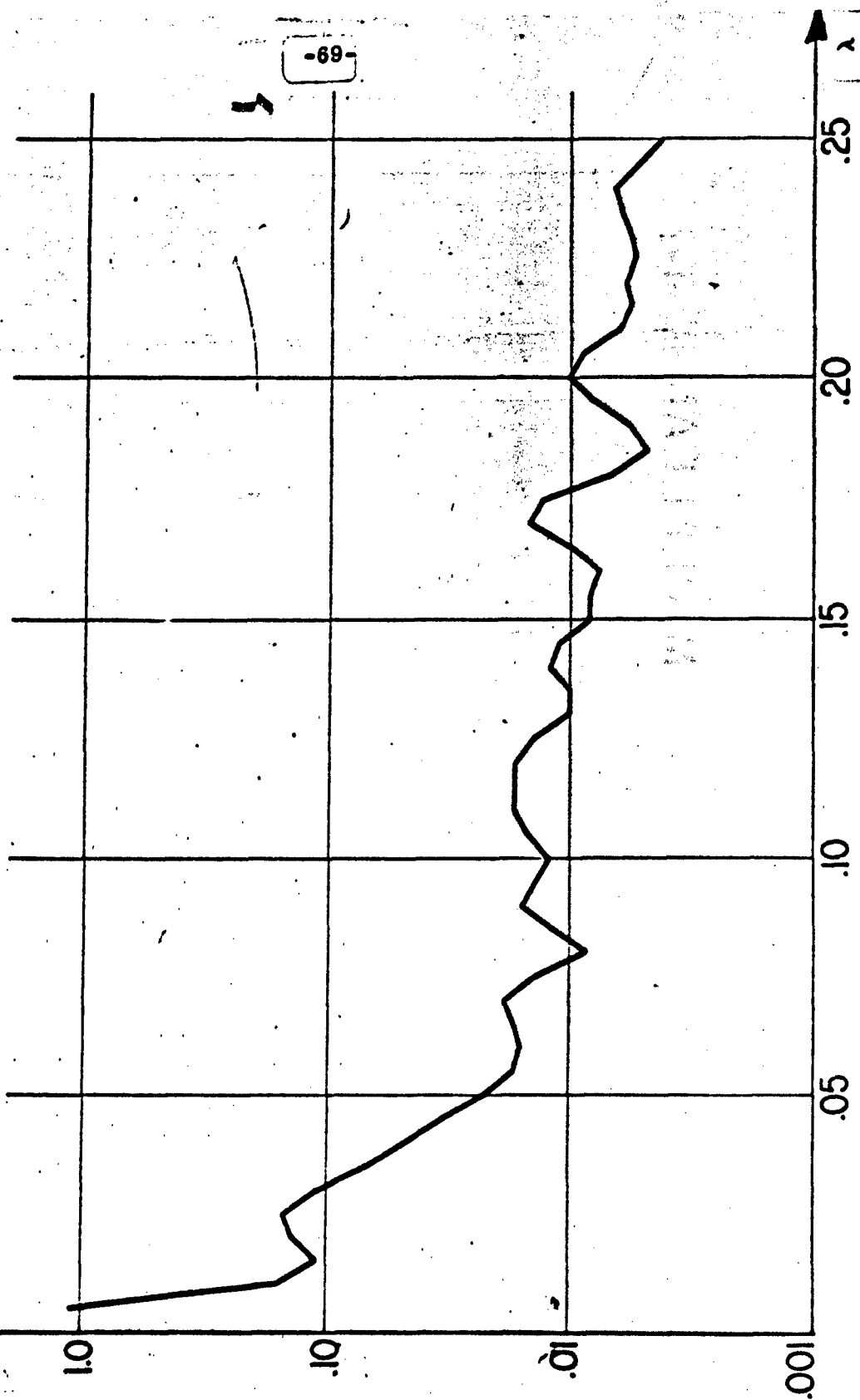
p.s.d.

▲

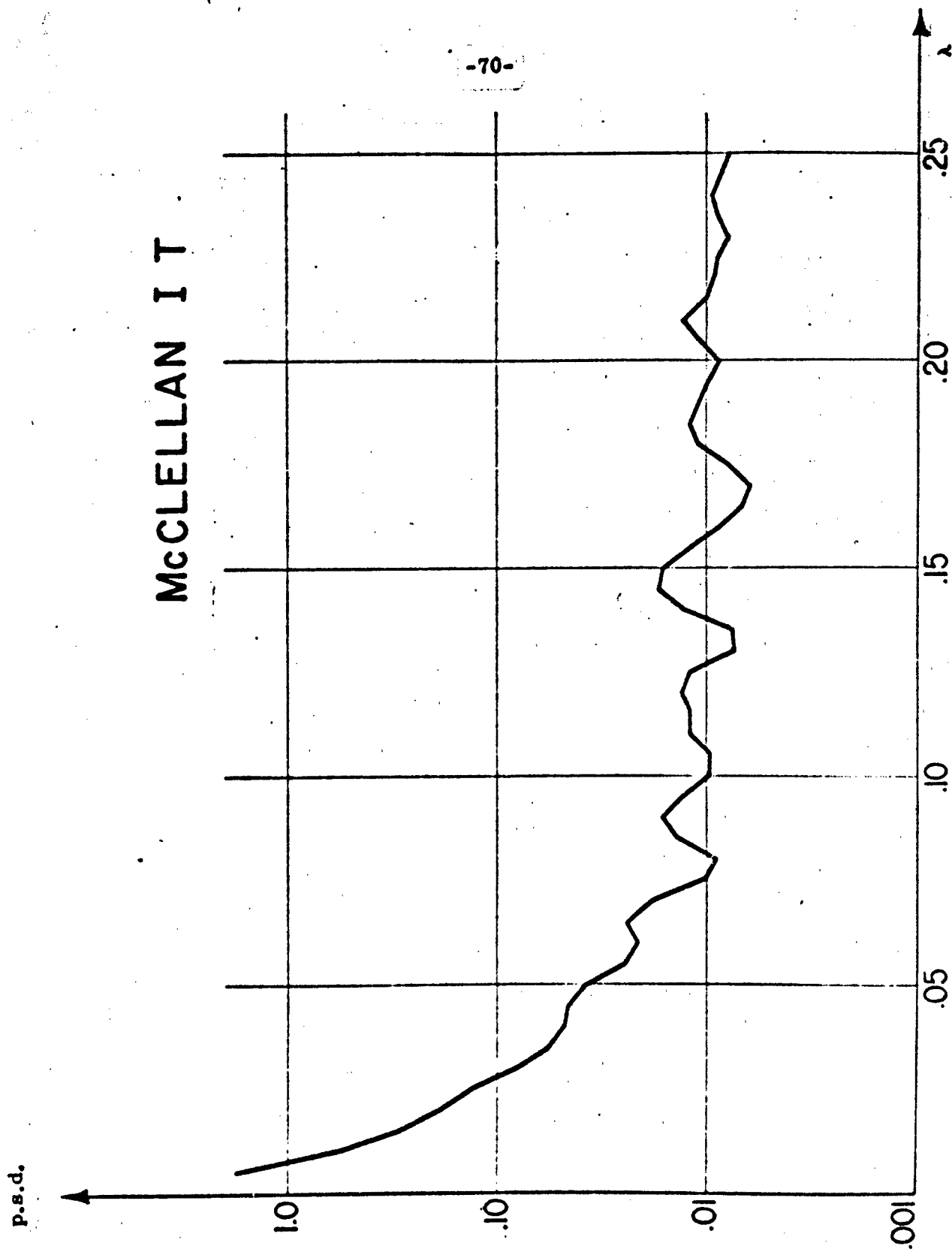


p.s.d.

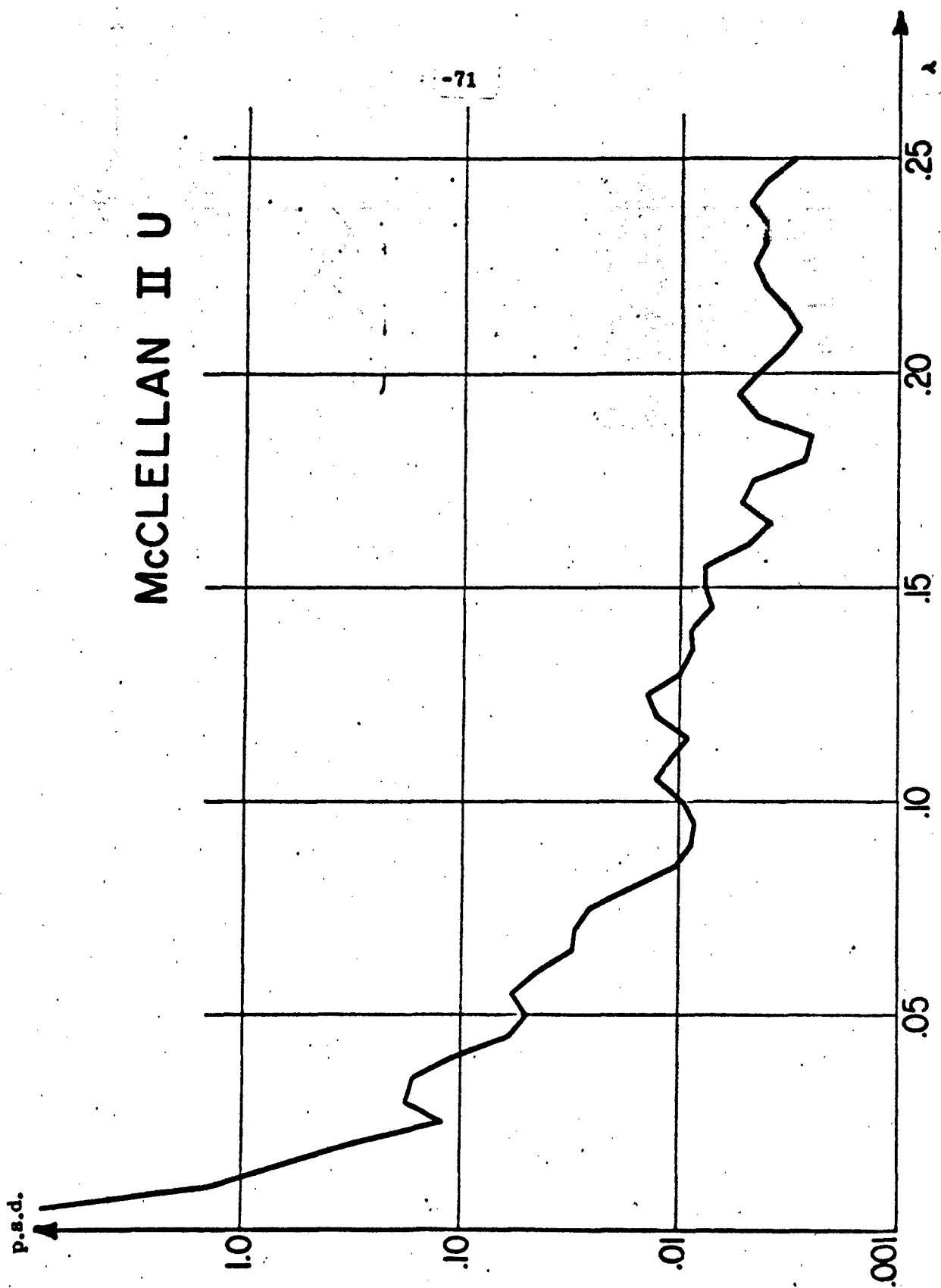
BENNING II S



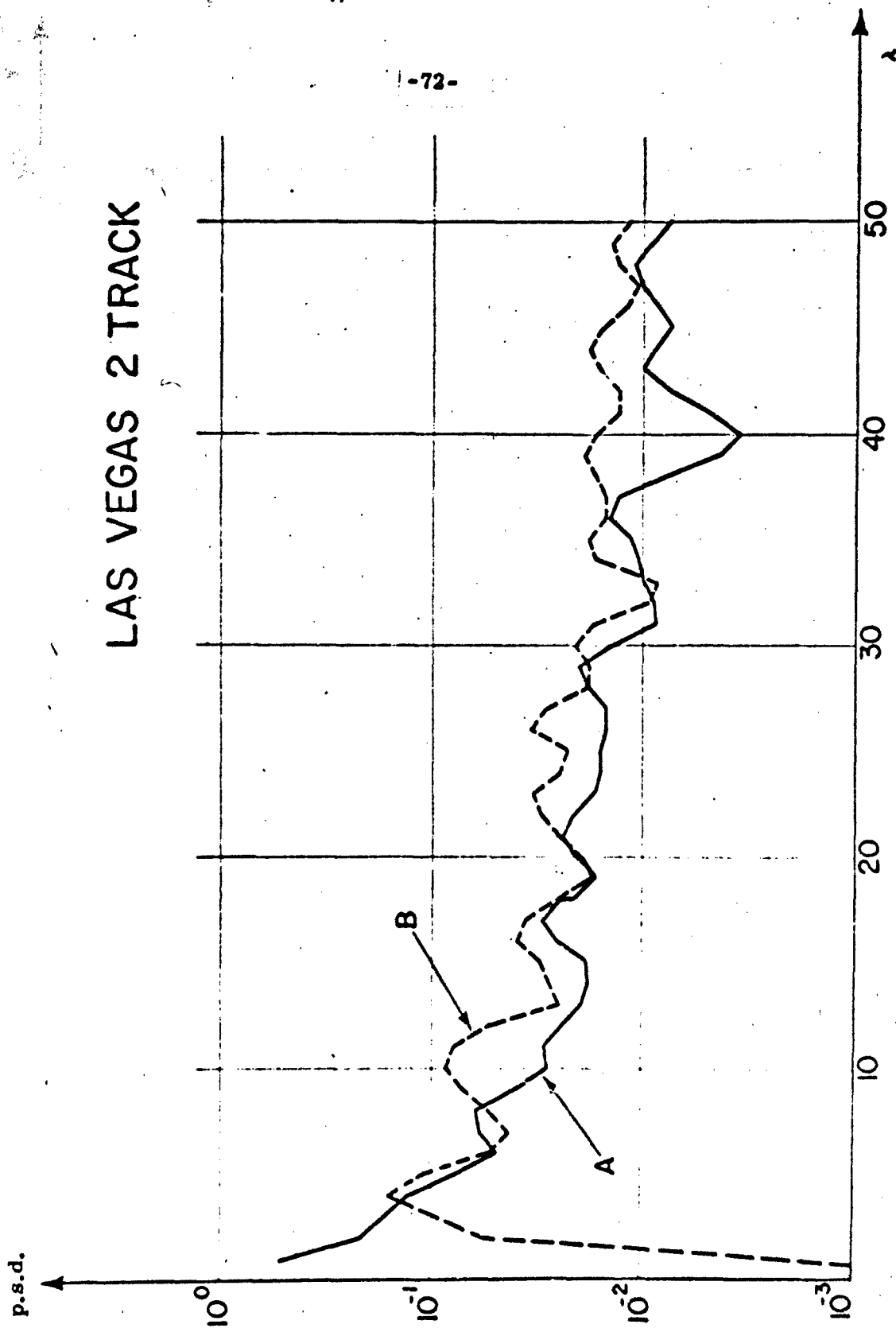
McCLELLAN I T



McCLELLAN II U



LAS VEGAS 2 TRACK



AREA SPECTRA

Again our methods of obtaining p.s.d. estimates of area data are described in [1]. The computer program used will be described in the section on computations.

In this section, we present the spectral estimates in numerical form and contour graphs. The raw data are too voluminous to present in this report; persons wishing to use this data may obtain it at cost in the more convenient form of IBM cards or magnetic tapes from MASC.

Because of symmetry, only half of the spectral estimates are presented in tabular form. Somewhat more complete contour graphs are given. The contour heights are in powers of 5 corresponding to the semi-logarithmic plots of the line spectra. On each contour diagram is an arrow indicating the direction North.

The statistical accuracy of the spectral estimates may be presented as on p 72 of [1]. Each estimate has 32 degrees of freedom. A 95% confidence interval may be given by the factors .648, 1.740. [We are 95% confident that a true spectral value is between .648 times the estimate and 1.740 times its estimate.]

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.010	0.010	0.007	0.005	0.007
-19	0.009	0.009	0.007	0.006	0.007
-18	0.008	0.008	0.007	0.007	0.007
-17	0.009	0.009	0.007	0.007	0.009
-16	0.013	0.013	0.010	0.009	0.010
-15	0.013	0.017	0.016	0.011	0.010
-14	0.013	0.019	0.016	0.012	0.014
-13	0.014	0.018	0.014	0.013	0.017
-12	0.015	0.016	0.017	0.017	0.018
-11	0.016	0.018	0.021	0.021	0.021
-10	0.018	0.020	0.021	0.022	0.022
-9	0.020	0.023	0.025	0.024	0.023
-8	0.021	0.029	0.031	0.029	0.028
-7	0.025	0.034	0.039	0.043	0.039
-6	0.033	0.047	0.059	0.058	0.043
-5	0.049	0.071	0.080	0.060	0.041
-4	0.091	0.141	0.141	0.074	0.047
-3	0.187	0.396	0.265	0.094	0.056
-2	0.648	0.900	0.322	0.118	0.080
-1	4.113	1.587	0.537	0.293	0.139
0		4.451	1.522	0.700	0.355
1	4.113	1.467	0.960	0.597	0.403
2	0.648	0.337	0.219	0.179	0.144
3	0.187	0.136	0.100	0.086	0.066
4	0.091	0.075	0.053	0.046	0.041
5	0.049	0.040	0.037	0.032	0.031
6	0.033	0.026	0.029	0.029	0.027
7	0.025	0.022	0.022	0.019	0.023
8	0.021	0.028	0.028	0.022	0.021
9	0.020	0.029	0.028	0.021	0.016
10	0.018	0.017	0.016	0.014	0.013
11	0.016	0.014	0.014	0.014	0.015
12	0.015	0.017	0.016	0.013	0.013
13	0.014	0.015	0.016	0.011	0.011
14	0.013	0.012	0.012	0.009	0.011
15	0.013	0.014	0.012	0.010	0.014
16	0.013	0.015	0.013	0.011	0.017
17	0.009	0.010	0.009	0.009	0.013
18	0.008	0.008	0.007	0.009	0.013
19	0.009	0.008	0.006	0.008	0.013
20	0.010	0.007	0.005	0.007	0.011

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CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.008	0.009	0.010	0.011	0.010
-19	0.008	0.010	0.009	0.010	0.010
-18	0.010	0.012	0.010	0.008	0.010
-17	0.010	0.012	0.012	0.011	0.011
-16	0.010	0.011	0.012	0.011	0.010
-15	0.011	0.011	0.011	0.011	0.009
-14	0.012	0.011	0.009	0.010	0.010
-13	0.015	0.012	0.012	0.011	0.011
-12	0.017	0.013	0.011	0.011	0.012
-11	0.022	0.017	0.015	0.013	0.011
-10	0.020	0.018	0.020	0.016	0.010
-9	0.017	0.016	0.019	0.015	0.010
-8	0.023	0.019	0.020	0.015	0.009
-7	0.030	0.028	0.027	0.015	0.011
-6	0.028	0.027	0.026	0.017	0.017
-5	0.028	0.022	0.020	0.019	0.019
-4	0.034	0.023	0.021	0.024	0.021
-3	0.037	0.032	0.031	0.027	0.027
-2	0.049	0.041	0.038	0.028	0.024
-1	0.072	0.049	0.038	0.034	0.030
0	0.221	0.120	0.067	0.055	0.046
1	0.295	0.177	0.109	0.077	0.064
2	0.128	0.106	0.090	0.075	0.070
3	0.052	0.046	0.066	0.071	0.056
4	0.037	0.033	0.049	0.061	0.048
5	0.030	0.027	0.030	0.036	0.033
6	0.021	0.019	0.020	0.025	0.024
7	0.018	0.014	0.012	0.015	0.020
8	0.019	0.013	0.010	0.009	0.014
9	0.016	0.015	0.012	0.010	0.010
10	0.013	0.014	0.013	0.012	0.012
11	0.013	0.012	0.012	0.013	0.014
12	0.012	0.010	0.011	0.010	0.009
13	0.012	0.011	0.013	0.011	0.008
14	0.014	0.014	0.016	0.013	0.009
15	0.017	0.016	0.012	0.010	0.011
16	0.020	0.017	0.011	0.009	0.012
17	0.015	0.013	0.011	0.009	0.009
18	0.013	0.011	0.010	0.009	0.008
19	0.014	0.011	0.010	0.009	0.010
20	0.012	0.011	0.010	0.010	0.012

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CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.008	0.008	0.007	0.007	0.007
-19	0.008	0.009	0.008	0.007	0.006
-18	0.011	0.012	0.010	0.009	0.007
-17	0.013	0.012	0.009	0.009	0.009
-16	0.009	0.009	0.008	0.009	0.010
-15	0.008	0.008	0.008	0.008	0.009
-14	0.009	0.010	0.008	0.006	0.008
-13	0.011	0.014	0.013	0.009	0.009
-12	0.012	0.014	0.015	0.012	0.009
-11	0.010	0.011	0.013	0.011	0.008
-10	0.008	0.010	0.012	0.011	0.010
-9	0.009	0.011	0.011	0.012	0.011
-8	0.010	0.011	0.012	0.011	0.009
-7	0.012	0.012	0.012	0.010	0.007
-6	0.017	0.014	0.012	0.011	0.009
-5	0.018	0.016	0.013	0.012	0.014
-4	0.020	0.017	0.014	0.014	0.016
-3	0.030	0.022	0.014	0.016	0.018
-2	0.027	0.022	0.016	0.020	0.021
-1	0.025	0.025	0.025	0.026	0.024
0	0.037	0.035	0.033	0.028	0.023
1	0.061	0.053	0.039	0.032	0.024
2	0.072	0.064	0.045	0.038	0.033
3	0.042	0.032	0.025	0.028	0.028
4	0.032	0.020	0.013	0.015	0.016
5	0.029	0.023	0.015	0.015	0.013
6	0.023	0.019	0.017	0.016	0.011
7	0.021	0.016	0.014	0.014	0.009
8	0.022	0.018	0.011	0.009	0.009
9	0.014	0.014	0.012	0.010	0.010
10	0.012	0.011	0.011	0.012	0.011
11	0.011	0.008	0.008	0.009	0.011
12	0.010	0.010	0.009	0.009	0.012
13	0.009	0.011	0.012	0.012	0.011
14	0.009	0.009	0.009	0.009	0.009
15	0.012	0.011	0.008	0.007	0.007
16	0.015	0.012	0.009	0.007	0.006
17	0.011	0.010	0.007	0.007	0.006
18	0.009	0.008	0.006	0.008	0.008
19	0.010	0.007	0.007	0.009	0.008
20	0.011	0.007	0.007	0.008	0.006

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CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.006	0.007	0.008	0.009	0.009
-19	0.006	0.007	0.007	0.009	0.008
-18	0.006	0.006	0.007	0.008	0.007
-17	0.006	0.007	0.008	0.008	0.008
-16	0.008	0.008	0.008	0.008	0.008
-15	0.008	0.007	0.008	0.010	0.008
-14	0.009	0.008	0.009	0.011	0.009
-13	0.010	0.009	0.010	0.010	0.009
-12	0.010	0.012	0.012	0.009	0.007
-11	0.010	0.014	0.012	0.008	0.007
-10	0.010	0.011	0.010	0.009	0.008
-9	0.009	0.009	0.009	0.010	0.009
-8	0.008	0.010	0.011	0.012	0.010
-7	0.006	0.009	0.011	0.010	0.009
-6	0.005	0.006	0.009	0.008	0.009
-5	0.011	0.010	0.011	0.008	0.010
-4	0.017	0.017	0.014	0.013	0.011
-3	0.018	0.016	0.014	0.013	0.014
-2	0.017	0.015	0.014	0.018	0.019
-1	0.022	0.023	0.021	0.026	0.032
0	0.025	0.028	0.026	0.033	0.043
1	0.021	0.024	0.022	0.022	0.028
2	0.028	0.030	0.025	0.022	0.020
3	0.029	0.035	0.032	0.029	0.025
4	0.018	0.021	0.020	0.019	0.022
5	0.013	0.012	0.010	0.010	0.013
6	0.011	0.012	0.010	0.009	0.010
7	0.009	0.011	0.011	0.011	0.009
8	0.009	0.011	0.013	0.011	0.009
9	0.011	0.012	0.012	0.011	0.009
10	0.011	0.010	0.011	0.011	0.009
11	0.010	0.009	0.009	0.009	0.007
12	0.011	0.008	0.009	0.008	0.006
13	0.011	0.009	0.008	0.008	0.008
14	0.008	0.008	0.007	0.007	0.008
15	0.006	0.007	0.007	0.006	0.007
16	0.006	0.006	0.007	0.006	0.006
17	0.006	0.006	0.007	0.008	0.008
18	0.006	0.007	0.006	0.007	0.008
19	0.007	0.008	0.007	0.006	0.007
20	0.007	0.008	0.007	0.006	0.006

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CORRECTED SPECTRUM, (F-STAR)

20

-20	0.009
-19	0.008
-18	0.006
-17	0.008
-16	0.009
-15	0.006
-14	0.007
-13	0.008
-12	0.008
-11	0.008

-10	0.009
-9	0.008
-8	0.009
-7	0.009
-6	0.013
-5	0.014
-4	0.013
-3	0.014
-2	0.018
-1	0.035

0	0.048
1	0.030
2	0.018
3	0.022
4	0.022
5	0.015
6	0.009
7	0.009
8	0.009
9	0.008

10	0.007
11	0.006
12	0.006
13	0.008
14	0.009
15	0.006
16	0.005
17	0.007
18	0.008
19	0.007

20	0.007
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CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.025	0.026	0.022	0.020	0.027
-19	0.027	0.027	0.023	0.023	0.031
-18	0.034	0.028	0.021	0.024	0.032
-17	0.052	0.046	0.025	0.020	0.029
-16	0.063	0.063	0.032	0.016	0.029
-15	0.053	0.058	0.038	0.025	0.032
-14	0.035	0.038	0.038	0.033	0.026
-13	0.023	0.023	0.028	0.026	0.018
-12	0.027	0.025	0.030	0.025	0.019
-11	0.028	0.026	0.032	0.032	0.028
-10	0.026	0.023	0.029	0.034	0.028
-9	0.029	0.028	0.037	0.036	0.022
-8	0.035	0.039	0.040	0.031	0.021
-7	0.041	0.050	0.047	0.034	0.031
-6	0.051	0.065	0.061	0.034	0.029
-5	0.095	0.105	0.071	0.034	0.030
-4	0.167	0.192	0.100	0.058	0.050
-3	0.327	0.333	0.216	0.191	0.114
-2	0.947	0.695	0.404	0.395	0.255
-1	7.432	3.037	1.402	1.005	0.802
0		8.790	3.096	1.423	0.949
1	7.432	2.734	1.244	0.594	0.336
2	0.947	0.730	0.383	0.266	0.144
3	0.327	0.275	0.229	0.164	0.129
4	0.167	0.108	0.098	0.076	0.083
5	0.095	0.063	0.060	0.051	0.053
6	0.051	0.048	0.057	0.047	0.046
7	0.041	0.049	0.051	0.033	0.029
8	0.035	0.041	0.043	0.032	0.028
9	0.029	0.030	0.028	0.034	0.041
10	0.026	0.030	0.030	0.034	0.044
11	0.028	0.044	0.046	0.033	0.028
12	0.027	0.048	0.052	0.030	0.017
13	0.023	0.045	0.054	0.033	0.019
14	0.035	0.050	0.055	0.034	0.025
15	0.053	0.057	0.051	0.028	0.022
16	0.063	0.057	0.046	0.031	0.028
17	0.052	0.042	0.039	0.044	0.040
18	0.034	0.033	0.037	0.049	0.044
19	0.027	0.030	0.029	0.033	0.038
20	0.025	0.025	0.021	0.024	0.037

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CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.025	0.017	0.014	0.020	0.027
-19	0.025	0.015	0.014	0.020	0.027
-18	0.026	0.016	0.014	0.018	0.026
-17	0.028	0.026	0.024	0.020	0.023
-16	0.036	0.035	0.035	0.022	0.020
-15	0.036	0.034	0.036	0.027	0.023
-14	0.025	0.029	0.030	0.027	0.027
-13	0.024	0.038	0.036	0.035	0.034
-12	0.027	0.047	0.041	0.030	0.030
-11	0.026	0.036	0.035	0.030	0.029
-10	0.022	0.023	0.031	0.032	0.029
-9	0.018	0.024	0.036	0.035	0.026
-8	0.024	0.034	0.035	0.026	0.022
-7	0.032	0.032	0.025	0.024	0.031
-6	0.027	0.031	0.029	0.027	0.028
-5	0.034	0.042	0.040	0.037	0.035
-4	0.042	0.041	0.043	0.045	0.060
-3	0.057	0.048	0.056	0.051	0.059
-2	0.160	0.116	0.123	0.082	0.058
-1	0.445	0.268	0.226	0.151	0.124
0	0.456	0.287	0.228	0.174	0.176
1	0.202	0.200	0.205	0.174	0.152
2	0.113	0.141	0.162	0.158	0.140
3	0.210	0.238	0.203	0.189	0.159
4	0.234	0.418	0.486	0.397	0.222
5	0.131	0.367	0.670	0.727	0.407
6	0.084	0.189	0.363	0.509	0.363
7	0.060	0.086	0.124	0.190	0.167
8	0.043	0.050	0.078	0.136	0.117
9	0.045	0.049	0.046	0.063	0.074
10	0.040	0.041	0.034	0.028	0.037
11	0.024	0.034	0.041	0.035	0.023
12	0.013	0.021	0.044	0.058	0.036
13	0.015	0.018	0.031	0.041	0.028
14	0.025	0.023	0.018	0.022	0.021
15	0.025	0.026	0.022	0.021	0.023
16	0.025	0.028	0.038	0.034	0.023
17	0.027	0.029	0.041	0.034	0.023
18	0.025	0.024	0.030	0.029	0.027
19	0.027	0.023	0.028	0.026	0.020
20	0.029	0.024	0.029	0.028	0.020

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.028	0.027	0.028	0.030	0.026
-19	0.030	0.031	0.029	0.029	0.026
-18	0.029	0.031	0.027	0.024	0.025
-17	0.027	0.030	0.028	0.021	0.022
-16	0.027	0.029	0.031	0.021	0.015
-15	0.027	0.024	0.029	0.028	0.020
-14	0.029	0.026	0.026	0.030	0.027
-13	0.032	0.032	0.032	0.038	0.040
-12	0.029	0.037	0.044	0.046	0.050
-11	0.028	0.036	0.039	0.038	0.042
-10	0.027	0.028	0.032	0.047	0.065
-9	0.025	0.023	0.032	0.053	0.069
-8	0.026	0.025	0.026	0.033	0.036
-7	0.037	0.030	0.023	0.025	0.031
-6	0.036	0.030	0.029	0.035	0.037
-5	0.039	0.033	0.034	0.039	0.041
-4	0.055	0.034	0.033	0.035	0.034
-3	0.049	0.032	0.032	0.032	0.032
-2	0.051	0.046	0.046	0.041	0.044
-1	0.097	0.060	0.042	0.052	0.069
0	0.128	0.074	0.042	0.047	0.056
1	0.105	0.064	0.038	0.035	0.039
2	0.101	0.061	0.037	0.039	0.050
3	0.139	0.100	0.056	0.046	0.060
4	0.173	0.156	0.098	0.057	0.054
5	0.198	0.139	0.095	0.059	0.051
6	0.198	0.119	0.073	0.053	0.065
7	0.140	0.128	0.102	0.072	0.067
8	0.101	0.128	0.135	0.114	0.094
9	0.072	0.092	0.119	0.158	0.180
10	0.049	0.061	0.087	0.144	0.205
11	0.030	0.049	0.073	0.095	0.161
12	0.024	0.037	0.062	0.073	0.114
13	0.019	0.041	0.079	0.075	0.083
14	0.022	0.037	0.066	0.077	0.088
15	0.023	0.024	0.037	0.059	0.067
16	0.021	0.022	0.025	0.032	0.044
17	0.026	0.025	0.024	0.025	0.030
18	0.031	0.032	0.033	0.026	0.024
19	0.029	0.038	0.036	0.024	0.022
20	0.028	0.035	0.030	0.026	0.026

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CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.025	0.032	0.032	0.042	0.067
-19	0.024	0.027	0.030	0.046	0.066
-18	0.026	0.025	0.029	0.044	0.054
-17	0.027	0.025	0.028	0.037	0.042
-16	0.019	0.023	0.027	0.044	0.050
-15	0.024	0.029	0.031	0.056	0.066
-14	0.030	0.035	0.034	0.050	0.057
-13	0.034	0.030	0.031	0.041	0.038
-12	0.040	0.032	0.033	0.033	0.024
-11	0.043	0.044	0.038	0.029	0.025
-10	0.075	0.066	0.042	0.029	0.029
-9	0.073	0.062	0.048	0.034	0.031
-8	0.034	0.034	0.041	0.034	0.029
-7	0.032	0.031	0.036	0.034	0.027
-6	0.043	0.042	0.041	0.040	0.027
-5	0.049	0.053	0.048	0.042	0.033
-4	0.044	0.053	0.051	0.047	0.040
-3	0.041	0.045	0.051	0.053	0.041
-2	0.039	0.035	0.046	0.047	0.031
-1	0.051	0.043	0.055	0.044	0.029
0	0.043	0.046	0.072	0.074	0.047
1	0.037	0.047	0.072	0.074	0.048
2	0.053	0.072	0.072	0.047	0.029
3	0.069	0.083	0.079	0.053	0.040
4	0.057	0.070	0.072	0.056	0.053
5	0.076	0.091	0.081	0.061	0.049
6	0.112	0.112	0.092	0.072	0.058
7	0.085	0.087	0.094	0.107	0.122
8	0.086	0.096	0.102	0.113	0.130
9	0.141	0.111	0.090	0.068	0.057
10	0.166	0.106	0.083	0.069	0.042
11	0.154	0.117	0.100	0.076	0.043
12	0.120	0.113	0.101	0.058	0.034
13	0.114	0.124	0.099	0.049	0.034
14	0.122	0.122	0.082	0.046	0.033
15	0.069	0.066	0.055	0.054	0.040
16	0.039	0.031	0.033	0.044	0.047
17	0.031	0.026	0.023	0.032	0.044
18	0.027	0.027	0.022	0.026	0.035
19	0.032	0.038	0.033	0.044	0.052
20	0.036	0.038	0.039	0.063	0.072

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.084
-19	0.069
-18	0.048
-17	0.037
-16	0.040
-15	0.053
-14	0.048
-13	0.031
-12	0.022
-11	0.028

-10	0.034
-9	0.040
-8	0.037
-7	0.032
-6	0.026
-5	0.031
-4	0.036
-3	0.034
-2	0.025
-1	0.028

0	0.039
1	0.039
2	0.026
3	0.037
4	0.049
5	0.040
6	0.052
7	0.119
8	0.131
9	0.056

10	0.025
11	0.025
12	0.032
13	0.040
14	0.033
15	0.032
16	0.044
17	0.043
18	0.035
19	0.047

20	0.057
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GRUBER 1 GRID C

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CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.021	0.018	0.012	0.009	0.007
-19	0.020	0.020	0.016	0.014	0.010
-18	0.021	0.020	0.016	0.010	0.010
-17	0.017	0.013	0.011	0.013	0.015
-16	0.016	0.011	0.010	0.013	0.015
-15	0.020	0.018	0.017	0.022	0.023
-14	0.023	0.022	0.016	0.016	0.020
-13	0.026	0.024	0.017	0.017	0.020
-12	0.028	0.027	0.022	0.018	0.016
-11	0.028	0.032	0.029	0.024	0.019
-10	0.033	0.035	0.028	0.022	0.019
-9	0.038	0.034	0.023	0.025	0.024
-8	0.038	0.035	0.025	0.028	0.027
-7	0.042	0.034	0.025	0.028	0.026
-6	0.045	0.032	0.021	0.011	0.015
-5	0.049	0.033	0.029	0.024	0.023
-4	0.073	0.040	0.041	0.016	0.034
-3	0.305	0.183	0.089	0.077	0.068
-2	1.683	1.112	0.291	0.108	0.080
-1	10.715	6.666	2.156	0.687	0.441
0		38.842	9.335	3.275	1.526
1	10.715	10.522	10.673	10.751	8.121
2	1.683	1.646	2.978	7.816	11.308
3	0.305	0.327	0.254	1.050	3.438
4	0.073	0.075	0.065	-0.004	0.102
5	0.049	0.054	0.047	0.018	0.013
6	0.045	0.048	0.037	0.033	0.025
7	0.042	0.037	0.029	0.024	0.018
8	0.038	0.028	0.025	0.026	0.022
9	0.038	0.030	0.025	0.021	0.024
10	0.033	0.028	0.026	0.029	0.029
11	0.028	0.024	0.021	0.025	0.028
12	0.028	0.021	0.018	0.022	0.024
13	0.026	0.016	0.014	0.015	0.016
14	0.023	0.015	0.012	0.014	0.015
15	0.020	0.015	0.009	0.008	0.012
16	0.016	0.017	0.012	0.010	0.013
17	0.017	0.017	0.013	0.011	0.010
18	0.021	0.021	0.019	0.019	0.015
19	0.020	0.020	0.019	0.016	0.014
20	0.021	0.020	0.019	0.021	0.019

GRUBER 1 GRID C

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CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.017	0.026	0.019	0.010	0.009
-19	0.003	0.006	0.015	0.017	0.013
-18	0.016	0.019	0.017	0.019	0.019
-17	0.008	0.005	0.014	0.024	0.028
-16	0.022	0.025	0.019	0.018	0.026
-15	0.020	0.018	0.024	0.029	0.028
-14	0.028	0.028	0.027	0.031	0.022
-13	0.019	0.013	0.021	0.029	0.019
-12	0.024	0.027	0.021	0.017	0.018
-11	0.015	0.012	0.014	0.019	0.024
-10	0.027	0.031	0.017	0.011	0.015
-9	0.015	0.014	0.017	0.014	0.011
-8	0.028	0.030	0.023	0.013	0.011
-7	0.014	0.011	0.025	0.027	0.021
-6	0.034	0.036	0.027	0.023	0.023
-5	0.009	0.005	0.018	0.025	0.020
-4	0.069	0.055	0.025	0.019	0.017
-3	0.039	0.022	0.034	0.035	0.029
-2	0.115	0.094	0.055	0.032	0.030
-1	0.279	0.167	0.142	0.125	0.093
0	0.763	0.395	0.294	0.251	0.172
1	4.081	1.440	0.455	0.237	0.142
2	10.488	6.720	2.925	0.846	0.207
3	6.423	7.378	5.177	2.086	0.585
4	0.756	1.919	2.303	1.539	0.685
5	0.032	0.092	0.210	0.335	0.268
6	0.017	0.024	0.037	0.052	0.060
7	0.038	0.053	0.039	0.028	0.029
8	0.014	0.017	0.028	0.028	0.026
9	0.038	0.044	0.028	0.020	0.023
10	0.022	0.021	0.032	0.038	0.027
11	0.031	0.032	0.027	0.028	0.021
12	0.018	0.012	0.020	0.027	0.020
13	0.026	0.028	0.021	0.016	0.013
14	0.008	0.007	0.017	0.023	0.019
15	0.018	0.022	0.018	0.015	0.017
16	0.006	0.001	0.008	0.014	0.016
17	0.015	0.017	0.012	0.010	0.010
18	0.005	0.003	0.013	0.018	0.014
19	0.018	0.020	0.014	0.011	0.012
20	0.008	0.005	0.011	0.014	0.012

GRUBER 1 GRID C

-86-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.009	0.010	0.013	0.015	0.016
-19	0.009	0.010	0.014	0.018	0.017
-18	0.019	0.015	0.013	0.018	0.020
-17	0.027	0.020	0.015	0.016	0.017
-16	0.025	0.020	0.021	0.021	0.016
-15	0.025	0.020	0.021	0.022	0.019
-14	0.019	0.018	0.017	0.019	0.018
-13	0.016	0.019	0.021	0.020	0.020
-12	0.020	0.020	0.024	0.027	0.027
-11	0.022	0.016	0.018	0.020	0.022
-10	0.015	0.014	0.012	0.010	0.017
-9	0.012	0.015	0.013	0.011	0.015
-8	0.012	0.015	0.016	0.019	0.016
-7	0.013	0.015	0.018	0.021	0.017
-6	0.018	0.019	0.022	0.024	0.020
-5	0.019	0.021	0.027	0.030	0.023
-4	0.020	0.027	0.036	0.033	0.029
-3	0.025	0.033	0.040	0.032	0.026
-2	0.028	0.035	0.038	0.030	0.024
-1	0.070	0.076	0.072	0.055	0.045
0	0.130	0.149	0.136	0.092	0.072
1	0.101	0.112	0.105	0.067	0.053
2	0.092	0.065	0.054	0.035	0.036
3	0.169	0.071	0.051	0.035	0.034
4	0.227	0.128	0.091	0.054	0.033
5	0.156	0.144	0.147	0.120	0.071
6	0.060	0.077	0.124	0.141	0.124
7	0.024	0.035	0.054	0.070	0.086
8	0.019	0.023	0.030	0.030	0.033
9	0.017	0.016	0.020	0.022	0.023
10	0.012	0.011	0.017	0.020	0.017
11	0.011	0.013	0.014	0.014	0.014
12	0.014	0.017	0.017	0.014	0.013
13	0.015	0.020	0.017	0.014	0.015
14	0.016	0.019	0.016	0.012	0.015
15	0.018	0.021	0.015	0.011	0.017
16	0.016	0.017	0.014	0.014	0.017
17	0.010	0.012	0.014	0.017	0.015
18	0.009	0.009	0.013	0.015	0.012
19	0.011	0.009	0.009	0.010	0.011
20	0.010	0.008	0.008	0.008	0.011

GRUBER 1 GRID C

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CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.013	0.013	0.012	0.013	0.015
-19	0.013	0.014	0.012	0.012	0.014
-18	0.017	0.015	0.013	0.012	0.012
-17	0.017	0.014	0.013	0.013	0.012
-16	0.017	0.016	0.014	0.015	0.014
-15	0.020	0.018	0.017	0.019	0.016
-14	0.018	0.017	0.019	0.018	0.016
-13	0.019	0.017	0.019	0.019	0.016
-12	0.020	0.015	0.019	0.024	0.022
-11	0.016	0.015	0.024	0.033	0.033
-10	0.020	0.022	0.031	0.035	0.035
-9	0.021	0.023	0.024	0.022	0.024
-8	0.015	0.020	0.020	0.015	0.016
-7	0.018	0.021	0.020	0.015	0.014
-6	0.017	0.017	0.018	0.019	0.014
-5	0.016	0.014	0.013	0.017	0.017
-4	0.024	0.020	0.015	0.018	0.023
-3	0.031	0.035	0.032	0.025	0.025
-2	0.032	0.042	0.036	0.025	0.031
-1	0.048	0.055	0.049	0.046	0.053
0	0.075	0.079	0.073	0.075	0.071
1	0.055	0.050	0.042	0.042	0.041
2	0.038	0.032	0.030	0.029	0.024
3	0.038	0.033	0.034	0.033	0.031
4	0.031	0.029	0.027	0.024	0.031
5	0.044	0.033	0.029	0.024	0.026
6	0.072	0.044	0.040	0.034	0.028
7	0.067	0.055	0.061	0.061	0.043
8	0.042	0.042	0.063	0.089	0.067
9	0.028	0.027	0.037	0.058	0.056
10	0.016	0.017	0.018	0.022	0.027
11	0.015	0.016	0.016	0.016	0.016
12	0.015	0.016	0.014	0.016	0.016
13	0.014	0.014	0.013	0.014	0.013
14	0.016	0.013	0.012	0.011	0.012
15	0.020	0.018	0.012	0.008	0.012
16	0.024	0.024	0.013	0.009	0.014
17	0.019	0.017	0.012	0.013	0.016
18	0.011	0.011	0.011	0.013	0.015
19	0.011	0.012	0.015	0.015	0.014
20	0.012	0.014	0.017	0.016	0.013

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.014
-19	0.015
-18	0.014
-17	0.012
-16	0.012
-15	0.014
-14	0.015
-13	0.016
-12	0.020
-11	0.030

-10	0.036
-9	0.028
-8	0.019
-7	0.016
-6	0.013
-5	0.019
-4	0.029
-3	0.030
-2	0.033
-1	0.062

0	0.082
1	0.048
2	0.025
3	0.030
4	0.030
5	0.025
6	0.021
7	0.034
8	0.049
9	0.049

10	0.030
11	0.018
12	0.016
13	0.012
14	0.015
15	0.015
16	0.017
17	0.017
18	0.016
19	0.014

20	0.013
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CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.008	0.011	0.011	0.008	0.006
-19	0.008	0.010	0.010	0.008	0.009
-18	0.010	0.009	0.009	0.006	0.007
-17	0.010	0.008	0.008	0.007	0.008
-16	0.008	0.007	0.007	0.006	0.006
-15	0.010	0.008	0.008	0.008	0.009
-14	0.012	0.012	0.011	0.009	0.008
-13	0.014	0.017	0.016	0.012	0.010
-12	0.016	0.022	0.016	0.012	0.009
-11	0.014	0.018	0.017	0.014	0.011
-10	0.014	0.015	0.016	0.013	0.013
-9	0.015	0.016	0.017	0.016	0.019
-8	0.015	0.018	0.020	0.017	0.015
-7	0.016	0.017	0.020	0.022	0.026
-6	0.020	0.020	0.023	0.029	0.040
-5	0.027	0.029	0.042	0.058	0.072
-4	0.051	0.052	0.079	0.099	0.089
-3	0.156	0.195	0.217	0.166	0.125
-2	0.982	1.354	0.843	0.588	0.417
-1	25.216	21.198	8.198	4.012	2.158
0	.	115.255	19.082	6.327	2.640
1	25.216	13.010	5.132	1.824	0.685
2	0.982	0.613	0.487	0.399	0.242
3	0.156	0.092	0.134	0.269	0.213
4	0.051	0.035	0.050	0.098	0.103
5	0.027	0.032	0.035	0.028	0.027
6	0.020	0.029	0.034	0.031	0.028
7	0.016	0.017	0.017	0.018	0.019
8	0.015	0.012	0.011	0.012	0.015
9	0.015	0.013	0.013	0.014	0.012
10	0.014	0.016	0.018	0.016	0.016
11	0.014	0.013	0.015	0.013	0.014
12	0.016	0.011	0.011	0.011	0.015
13	0.014	0.011	0.009	0.010	0.015
14	0.012	0.010	0.008	0.010	0.013
15	0.010	0.010	0.009	0.009	0.008
16	0.008	0.009	0.009	0.010	0.010
17	0.010	0.009	0.008	0.008	0.007
18	0.010	0.009	0.009	0.010	0.010
19	0.008	0.010	0.011	0.010	0.010
20	0.008	0.010	0.012	0.011	0.011

GRUBER 2 GRID D

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CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.009	0.010	0.010	0.008	0.006
-19	0.011	0.012	0.013	0.011	0.008
-18	0.009	0.011	0.011	0.010	0.007
-17	0.008	0.009	0.010	0.009	0.008
-16	0.005	0.006	0.010	0.010	0.008
-15	0.009	0.010	0.012	0.013	0.012
-14	0.009	0.008	0.009	0.010	0.009
-13	0.009	0.009	0.011	0.011	0.011
-12	0.007	0.008	0.012	0.012	0.011
-11	0.011	0.014	0.014	0.012	0.012
-10	0.015	0.017	0.018	0.016	0.014
-9	0.022	0.023	0.024	0.022	0.017
-8	0.020	0.022	0.022	0.023	0.021
-7	0.030	0.028	0.029	0.034	0.041
-6	0.046	0.036	0.032	0.040	0.053
-5	0.069	0.069	0.054	0.045	0.057
-4	0.076	0.093	0.075	0.054	0.059
-3	0.103	0.107	0.093	0.079	0.083
-2	0.287	0.256	0.217	0.174	0.164
-1	1.100	0.757	0.492	0.349	0.334
0	1.182	0.703	0.392	0.274	0.263
1	0.324	0.209	0.131	0.106	0.107
2	0.134	0.106	0.075	0.067	0.075
3	0.099	0.084	0.064	0.051	0.047
4	0.061	0.058	0.051	0.035	0.023
5	0.029	0.035	0.038	0.027	0.017
6	0.027	0.033	0.034	0.023	0.018
7	0.021	0.024	0.022	0.018	0.023
8	0.017	0.023	0.025	0.028	0.035
9	0.013	0.018	0.025	0.028	0.025
10	0.015	0.013	0.018	0.020	0.019
11	0.014	0.011	0.013	0.016	0.013
12	0.017	0.013	0.014	0.012	0.009
13	0.014	0.009	0.010	0.009	0.007
14	0.011	0.008	0.011	0.011	0.009
15	0.007	0.009	0.012	0.012	0.009
16	0.009	0.010	0.011	0.011	0.008
17	0.006	0.006	0.008	0.011	0.008
18	0.009	0.007	0.010	0.013	0.009
19	0.008	0.008	0.011	0.012	0.007
20	0.011	0.011	0.014	0.012	0.008

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.008	0.008	0.007	0.008	0.006
-19	0.008	0.008	0.007	0.007	0.005
-18	0.007	0.006	0.006	0.008	0.007
-17	0.007	0.008	0.008	0.008	0.008
-16	0.008	0.008	0.007	0.007	0.010
-15	0.009	0.008	0.008	0.010	0.013
-14	0.007	0.009	0.010	0.010	0.010
-13	0.009	0.009	0.011	0.011	0.009
-12	0.011	0.009	0.011	0.013	0.011
-11	0.012	0.010	0.011	0.013	0.011
-10	0.013	0.012	0.014	0.014	0.010
-9	0.017	0.018	0.023	0.024	0.015
-8	0.023	0.024	0.031	0.032	0.016
-7	0.032	0.028	0.035	0.032	0.016
-6	0.045	0.033	0.039	0.036	0.021
-5	0.055	0.049	0.058	0.050	0.035
-4	0.071	0.078	0.077	0.056	0.042
-3	0.089	0.089	0.079	0.050	0.043
-2	0.158	0.130	0.110	0.094	0.078
-1	0.289	0.226	0.177	0.155	0.132
0	0.222	0.204	0.157	0.127	0.125
1	0.113	0.110	0.075	0.058	0.060
2	0.081	0.074	0.056	0.044	0.035
3	0.043	0.040	0.048	0.051	0.044
4	0.018	0.018	0.024	0.029	0.028
5	0.016	0.016	0.015	0.013	0.014
6	0.018	0.017	0.016	0.012	0.010
7	0.021	0.016	0.014	0.011	0.009
8	0.027	0.015	0.011	0.011	0.011
9	0.021	0.013	0.008	0.011	0.011
10	0.015	0.010	0.010	0.012	0.009
11	0.011	0.010	0.012	0.012	0.008
12	0.009	0.012	0.013	0.014	0.010
13	0.007	0.009	0.012	0.014	0.011
14	0.007	0.008	0.010	0.009	0.008
15	0.006	0.008	0.008	0.006	0.005
16	0.005	0.007	0.007	0.006	0.005
17	0.007	0.007	0.007	0.007	0.007
18	0.007	0.008	0.008	0.007	0.007
19	0.007	0.008	0.008	0.007	0.007
20	0.009	0.010	0.008	0.006	0.006

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.005	0.007	0.008	0.006	0.007
-19	0.004	0.006	0.009	0.007	0.006
-18	0.004	0.004	0.007	0.008	0.006
-17	0.006	0.006	0.007	0.008	0.009
-16	0.009	0.007	0.008	0.011	0.011
-15	0.013	0.007	0.008	0.010	0.008
-14	0.009	0.007	0.007	0.008	0.007
-13	0.007	0.008	0.009	0.009	0.009
-12	0.008	0.007	0.007	0.010	0.012
-11	0.008	0.008	0.008	0.010	0.013
-10	0.009	0.010	0.012	0.013	0.013
-9	0.013	0.013	0.013	0.012	0.012
-8	0.010	0.010	0.009	0.011	0.012
-7	0.012	0.014	0.014	0.015	0.015
-6	0.022	0.029	0.027	0.019	0.014
-5	0.032	0.034	0.026	0.015	0.013
-4	0.034	0.028	0.022	0.013	0.013
-3	0.045	0.032	0.028	0.019	0.013
-2	0.058	0.042	0.038	0.025	0.015
-1	0.099	0.068	0.048	0.035	0.031
0	0.093	0.060	0.043	0.043	0.046
1	0.037	0.027	0.037	0.036	0.031
2	0.030	0.026	0.031	0.024	0.018
3	0.043	0.032	0.022	0.018	0.014
4	0.026	0.024	0.017	0.014	0.012
5	0.010	0.010	0.011	0.012	0.013
6	0.007	0.008	0.009	0.010	0.011
7	0.007	0.008	0.010	0.010	0.011
8	0.009	0.011	0.012	0.010	0.011
9	0.009	0.011	0.011	0.009	0.009
10	0.008	0.009	0.009	0.008	0.007
11	0.006	0.007	0.008	0.009	0.008
12	0.007	0.009	0.011	0.012	0.011
13	0.009	0.011	0.012	0.011	0.009
14	0.009	0.011	0.011	0.012	0.010
15	0.007	0.010	0.010	0.015	0.017
16	0.007	0.009	0.009	0.010	0.013
17	0.008	0.008	0.005	0.005	0.005
18	0.007	0.007	0.006	0.005	0.006
19	0.006	0.006	0.006	0.006	0.006
20	0.006	0.007	0.006	0.005	0.006

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.007
-19	0.006
-18	0.006
-17	0.009
-16	0.009
-15	0.006
-14	0.006
-13	0.008
-12	0.011
-11	0.014

-10	0.013
-9	0.011
-8	0.011
-7	0.013
-6	0.011
-5	0.012
-4	0.014
-3	0.014
-2	0.017
-1	0.031

0	0.042
1	0.029
2	0.018
3	0.013
4	0.013
5	0.013
6	0.010
7	0.012
8	0.015
9	0.011

10	0.007
11	0.008
12	0.009
13	0.007
14	0.008
15	0.015
16	0.013
17	0.006
18	0.006
19	0.006

20	0.006
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CARSON 1 GRID E

-94-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.005	0.005	0.006	0.005	0.006
-19	0.005	0.005	0.007	0.006	0.006
-18	0.005	0.006	0.008	0.007	0.006
-17	0.005	0.006	0.007	0.008	0.008
-16	0.005	0.005	0.006	0.007	0.007
-15	0.007	0.006	0.005	0.005	0.007
-14	0.009	0.007	0.005	0.006	0.008
-13	0.009	0.006	0.006	0.006	0.007
-12	0.008	0.006	0.006	0.005	0.005
-11	0.009	0.006	0.006	0.006	0.007
-10	0.009	0.008	0.008	0.009	0.010
-9	0.013	0.011	0.011	0.011	0.011
-8	0.015	0.015	0.016	0.015	0.013
-7	0.018	0.021	0.021	0.020	0.018
-6	0.029	0.033	0.025	0.022	0.021
-5	0.050	0.042	0.036	0.032	0.028
-4	0.121	0.072	0.054	0.040	0.034
-3	0.319	0.195	0.102	0.054	0.041
-2	0.965	0.489	0.196	0.100	0.050
-1	8.177	1.590	0.379	0.175	0.070
0		5.347	0.568	0.208	0.077
1	8.177	2.673	0.519	0.171	0.072
2	0.965	0.822	0.313	0.125	0.075
3	0.319	0.328	0.158	0.081	0.064
4	0.121	0.137	0.082	0.057	0.043
5	0.050	0.052	0.047	0.037	0.028
6	0.029	0.027	0.031	0.025	0.024
7	0.018	0.018	0.020	0.025	0.029
8	0.015	0.016	0.015	0.022	0.031
9	0.013	0.015	0.017	0.020	0.029
10	0.009	0.014	0.016	0.017	0.028
11	0.009	0.014	0.015	0.013	0.021
12	0.008	0.014	0.015	0.011	0.011
13	0.009	0.012	0.011	0.010	0.008
14	0.009	0.010	0.011	0.010	0.008
15	0.007	0.009	0.011	0.008	0.006
16	0.005	0.007	0.008	0.007	0.006
17	0.005	0.006	0.007	0.006	0.007
18	0.005	0.007	0.006	0.004	0.006
19	0.005	0.006	0.005	0.004	0.004
20	0.005	0.006	0.006	0.005	0.004

CARSON 1 GRID E

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CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.006	0.005	0.006	0.007	0.010
-19	0.005	0.006	0.007	0.008	0.010
-18	0.005	0.007	0.009	0.009	0.009
-17	0.007	0.009	0.010	0.007	0.007
-16	0.008	0.008	0.007	0.006	0.006
-15	0.008	0.006	0.006	0.006	0.006
-14	0.008	0.008	0.008	0.007	0.007
-13	0.008	0.011	0.011	0.008	0.007
-12	0.007	0.009	0.009	0.007	0.007
-11	0.009	0.009	0.007	0.006	0.007
-10	0.011	0.012	0.012	0.010	0.008
-9	0.010	0.012	0.015	0.013	0.009
-8	0.012	0.012	0.013	0.011	0.012
-7	0.015	0.016	0.015	0.011	0.013
-6	0.018	0.018	0.016	0.014	0.014
-5	0.023	0.020	0.015	0.015	0.014
-4	0.028	0.021	0.015	0.012	0.011
-3	0.028	0.020	0.014	0.010	0.011
-2	0.028	0.021	0.017	0.014	0.015
-1	0.035	0.029	0.022	0.015	0.014
0	0.041	0.037	0.025	0.014	0.011
1	0.043	0.033	0.024	0.014	0.012
2	0.049	0.028	0.017	0.012	0.013
3	0.044	0.026	0.014	0.009	0.010
4	0.029	0.021	0.013	0.010	0.012
5	0.022	0.017	0.013	0.015	0.018
6	0.021	0.017	0.015	0.019	0.020
7	0.022	0.019	0.016	0.014	0.014
8	0.022	0.017	0.015	0.011	0.009
9	0.028	0.016	0.013	0.012	0.008
10	0.038	0.022	0.011	0.012	0.009
11	0.035	0.027	0.010	0.009	0.008
12	0.019	0.022	0.011	0.008	0.009
13	0.010	0.016	0.012	0.008	0.008
14	0.008	0.011	0.010	0.007	0.006
15	0.006	0.007	0.008	0.006	0.006
16	0.006	0.006	0.007	0.007	0.006
17	0.008	0.006	0.007	0.008	0.008
18	0.006	0.006	0.007	0.009	0.010
19	0.004	0.006	0.008	0.008	0.008
20	0.004	0.006	0.008	0.007	0.007

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.012	0.009	0.007	0.006	0.006
-19	0.012	0.009	0.007	0.007	0.006
-18	0.010	0.008	0.008	0.007	0.005
-17	0.008	0.008	0.008	0.008	0.007
-16	0.007	0.007	0.009	0.009	0.007
-15	0.006	0.005	0.007	0.007	0.006
-14	0.008	0.007	0.006	0.006	0.006
-13	0.010	0.010	0.008	0.008	0.007
-12	0.008	0.010	0.010	0.009	0.008
-11	0.006	0.008	0.009	0.007	0.007
-10	0.007	0.007	0.007	0.006	0.008
-9	0.009	0.009	0.008	0.006	0.008
-8	0.012	0.010	0.011	0.009	0.007
-7	0.013	0.011	0.012	0.011	0.008
-6	0.012	0.013	0.013	0.010	0.009
-5	0.012	0.015	0.015	0.012	0.012
-4	0.012	0.013	0.012	0.012	0.011
-3	0.012	0.011	0.009	0.009	0.007
-2	0.014	0.011	0.009	0.009	0.007
-1	0.014	0.013	0.011	0.010	0.008
0	0.012	0.015	0.015	0.012	0.011
1	0.014	0.015	0.013	0.012	0.012
2	0.014	0.013	0.010	0.012	0.013
3	0.012	0.013	0.010	0.011	0.014
4	0.013	0.012	0.009	0.011	0.014
5	0.015	0.012	0.009	0.009	0.010
6	0.016	0.013	0.012	0.010	0.008
7	0.017	0.018	0.016	0.013	0.009
8	0.013	0.020	0.020	0.013	0.009
9	0.008	0.013	0.015	0.012	0.008
10	0.006	0.007	0.008	0.008	0.009
11	0.007	0.007	0.007	0.007	0.009
12	0.009	0.007	0.006	0.006	0.008
13	0.007	0.007	0.006	0.007	0.008
14	0.006	0.007	0.008	0.008	0.008
15	0.006	0.007	0.008	0.008	0.008
16	0.005	0.005	0.006	0.007	0.007
17	0.006	0.005	0.006	0.006	0.006
18	0.008	0.007	0.006	0.006	0.007
19	0.009	0.010	0.010	0.007	0.007
20	0.008	0.011	0.011	0.007	0.006

CARSON 1 GRID E

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CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.007	0.006	0.006	0.006	0.006
-19	0.006	0.007	0.008	0.006	0.005
-18	0.004	0.006	0.008	0.006	0.004
-17	0.005	0.006	0.007	0.005	0.005
-16	0.006	0.006	0.006	0.007	0.008
-15	0.007	0.005	0.005	0.006	0.011
-14	0.006	0.005	0.005	0.008	0.011
-13	0.006	0.005	0.006	0.008	0.009
-12	0.007	0.006	0.005	0.004	0.006
-11	0.008	0.007	0.006	0.005	0.005
-10	0.008	0.007	0.006	0.006	0.008
-9	0.008	0.006	0.005	0.007	0.008
-8	0.006	0.007	0.007	0.007	0.008
-7	0.007	0.007	0.007	0.007	0.008
-6	0.010	0.009	0.006	0.006	0.008
-5	0.011	0.009	0.006	0.006	0.007
-4	0.008	0.006	0.005	0.006	0.007
-3	0.006	0.007	0.008	0.007	0.007
-2	0.007	0.009	0.010	0.007	0.007
-1	0.008	0.009	0.009	0.008	0.015
0	0.010	0.010	0.011	0.014	0.030
1	0.010	0.010	0.009	0.012	0.020
2	0.010	0.010	0.009	0.010	0.012
3	0.012	0.009	0.009	0.011	0.012
4	0.010	0.007	0.008	0.010	0.011
5	0.008	0.007	0.009	0.010	0.010
6	0.006	0.007	0.008	0.008	0.008
7	0.007	0.007	0.007	0.006	0.007
8	0.007	0.008	0.007	0.007	0.007
9	0.007	0.007	0.007	0.008	0.007
10	0.011	0.010	0.007	0.008	0.008
11	0.014	0.013	0.008	0.007	0.008
12	0.010	0.011	0.010	0.010	0.008
13	0.007	0.007	0.009	0.011	0.009
14	0.008	0.006	0.006	0.009	0.008
15	0.007	0.005	0.004	0.007	0.008
16	0.007	0.005	0.004	0.006	0.009
17	0.008	0.006	0.006	0.007	0.010
18	0.008	0.007	0.007	0.007	0.008
19	0.008	0.007	0.006	0.005	0.006
20	0.007	0.007	0.006	0.005	0.006

CARSON 1 GRID E

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CORRECTED SPECTRUM, (F-STAR)

20

-20	0.006
-19	0.005
-18	0.004
-17	0.005
-16	0.009
-15	0.012
-14	0.011
-13	0.008
-12	0.006
-11	0.006

-10	0.009
-9	0.010
-8	0.008
-7	0.008
-6	0.008
-5	0.008
-4	0.007
-3	0.007
-2	0.009
-1	0.024

0	0.045
1	0.028
2	0.011
3	0.012
4	0.011
5	0.010
6	0.009
7	0.009
8	0.008
9	0.008

10	0.009
11	0.009
12	0.008
13	0.007
14	0.007
15	0.007
16	0.009
17	0.011
18	0.009
19	0.008

20	0.007
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CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.009	0.010	0.008	0.009	0.009
-19	0.008	0.009	0.009	0.009	0.009
-18	0.007	0.009	0.010	0.013	0.011
-17	0.008	0.010	0.012	0.015	0.010
-16	0.010	0.012	0.013	0.012	0.010
-15	0.009	0.012	0.013	0.009	0.010
-14	0.010	0.012	0.011	0.007	0.007
-13	0.013	0.013	0.009	0.006	0.006
-12	0.013	0.012	0.008	0.008	0.011
-11	0.015	0.017	0.014	0.016	0.020
-10	0.017	0.021	0.021	0.025	0.024
-9	0.012	0.018	0.029	0.039	0.027
-8	0.010	0.015	0.041	0.054	0.030
-7	0.014	0.022	0.047	0.052	0.029
-6	0.024	0.029	0.039	0.036	0.023
-5	0.040	0.035	0.030	0.029	0.021
-4	0.087	0.060	0.047	0.042	0.026
-3	0.198	0.121	0.080	0.066	0.044
-2	0.831	0.299	0.133	0.095	0.071
-1	12.540	2.041	0.474	0.181	0.109
0		14.293	1.588	0.426	0.191
1	12.540	5.246	1.281	0.390	0.212
2	0.831	1.153	0.768	0.249	0.139
3	0.198	0.425	0.746	0.459	0.135
4	0.087	0.166	0.429	0.450	0.168
5	0.040	0.065	0.147	0.184	0.104
6	0.024	0.028	0.047	0.057	0.056
7	0.014	0.014	0.019	0.026	0.035
8	0.010	0.011	0.013	0.015	0.020
9	0.012	0.010	0.011	0.014	0.016
10	0.017	0.012	0.012	0.015	0.016
11	0.015	0.012	0.012	0.013	0.010
12	0.013	0.010	0.012	0.015	0.012
13	0.013	0.008	0.010	0.014	0.014
14	0.010	0.008	0.009	0.008	0.009
15	0.009	0.008	0.007	0.006	0.009
16	0.010	0.007	0.005	0.006	0.009
17	0.008	0.006	0.005	0.006	0.007
18	0.007	0.006	0.008	0.006	0.005
19	0.008	0.007	0.007	0.006	0.006
20	0.009	0.007	0.006	0.007	0.007

CARSON 2 GRID F

-100-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.008	0.011	0.013	0.009	0.006
-19	0.008	0.011	0.012	0.008	0.007
-18	0.011	0.013	0.010	0.010	0.011
-17	0.013	0.015	0.011	0.013	0.015
-16	0.014	0.015	0.011	0.012	0.013
-15	0.016	0.017	0.014	0.012	0.012
-14	0.010	0.014	0.014	0.012	0.010
-13	0.008	0.010	0.013	0.010	0.008
-12	0.011	0.010	0.012	0.008	0.006
-11	0.017	0.015	0.014	0.011	0.009
-10	0.021	0.019	0.016	0.014	0.013
-9	0.019	0.017	0.013	0.012	0.014
-8	0.020	0.016	0.013	0.013	0.016
-7	0.019	0.013	0.013	0.017	0.019
-6	0.017	0.016	0.018	0.024	0.024
-5	0.017	0.023	0.028	0.030	0.035
-4	0.019	0.027	0.036	0.034	0.037
-3	0.027	0.025	0.032	0.035	0.030
-2	0.044	0.029	0.024	0.025	0.023
-1	0.065	0.036	0.027	0.026	0.025
0	0.093	0.047	0.035	0.041	0.039
1	0.106	0.055	0.039	0.044	0.044
2	0.097	0.053	0.034	0.035	0.041
3	0.067	0.043	0.022	0.017	0.023
4	0.042	0.026	0.014	0.010	0.015
5	0.033	0.019	0.020	0.015	0.015
6	0.038	0.026	0.032	0.024	0.013
7	0.033	0.025	0.027	0.020	0.010
8	0.025	0.020	0.015	0.011	0.009
9	0.020	0.018	0.013	0.009	0.008
10	0.015	0.014	0.011	0.009	0.008
11	0.010	0.011	0.008	0.007	0.008
12	0.010	0.009	0.006	0.007	0.007
13	0.010	0.009	0.008	0.009	0.008
14	0.010	0.010	0.009	0.011	0.010
15	0.012	0.011	0.011	0.015	0.016
16	0.010	0.009	0.011	0.014	0.014
17	0.007	0.007	0.008	0.011	0.010
18	0.005	0.006	0.008	0.009	0.009
19	0.006	0.006	0.008	0.008	0.009
20	0.007	0.006	0.007	0.008	0.009

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.006	0.005	0.005	0.007	0.007
-19	0.006	0.005	0.006	0.008	0.008
-18	0.009	0.006	0.006	0.007	0.006
-17	0.011	0.008	0.006	0.005	0.004
-16	0.011	0.009	0.007	0.005	0.004
-15	0.010	0.010	0.009	0.007	0.005
-14	0.008	0.008	0.009	0.008	0.007
-13	0.007	0.007	0.007	0.008	0.010
-12	0.007	0.007	0.007	0.008	0.009
-11	0.008	0.008	0.007	0.007	0.007
-10	0.010	0.010	0.009	0.007	0.006
-9	0.017	0.017	0.011	0.007	0.007
-8	0.021	0.020	0.012	0.008	0.011
-7	0.018	0.017	0.020	0.028	0.026
-6	0.025	0.036	0.049	0.052	0.037
-5	0.050	0.060	0.051	0.034	0.022
-4	0.043	0.037	0.024	0.013	0.010
-3	0.022	0.017	0.014	0.010	0.010
-2	0.016	0.016	0.017	0.014	0.016
-1	0.023	0.026	0.023	0.018	0.018
0	0.032	0.032	0.025	0.017	0.015
1	0.030	0.021	0.016	0.017	0.017
2	0.036	0.022	0.018	0.020	0.019
3	0.028	0.024	0.023	0.025	0.020
4	0.017	0.013	0.015	0.018	0.015
5	0.013	0.009	0.011	0.013	0.011
6	0.011	0.009	0.009	0.011	0.012
7	0.010	0.008	0.008	0.012	0.013
8	0.009	0.006	0.006	0.010	0.011
9	0.009	0.006	0.006	0.008	0.009
10	0.008	0.006	0.005	0.007	0.008
11	0.007	0.006	0.007	0.006	0.005
12	0.006	0.006	0.008	0.006	0.005
13	0.006	0.007	0.008	0.006	0.006
14	0.007	0.007	0.007	0.006	0.008
15	0.011	0.008	0.007	0.007	0.007
16	0.010	0.008	0.008	0.009	0.008
17	0.008	0.008	0.009	0.009	0.007
18	0.008	0.007	0.007	0.009	0.008
19	0.008	0.007	0.007	0.007	0.007
20	0.009	0.008	0.008	0.006	0.005

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.006	0.005	0.004	0.004	0.006
-19	0.006	0.004	0.004	0.005	0.006
-18	0.005	0.004	0.004	0.005	0.005
-17	0.004	0.005	0.005	0.005	0.005
-16	0.003	0.006	0.007	0.005	0.007
-15	0.003	0.007	0.009	0.005	0.007
-14	0.006	0.009	0.011	0.006	0.006
-13	0.009	0.009	0.010	0.007	0.007
-12	0.010	0.010	0.010	0.009	0.008
-11	0.009	0.009	0.008	0.009	0.010
-10	0.008	0.007	0.006	0.008	0.012
-9	0.009	0.009	0.009	0.012	0.018
-8	0.013	0.013	0.013	0.015	0.018
-7	0.022	0.020	0.018	0.015	0.013
-6	0.029	0.024	0.019	0.016	0.014
-5	0.020	0.017	0.016	0.016	0.016
-4	0.010	0.014	0.014	0.013	0.014
-3	0.013	0.013	0.011	0.010	0.011
-2	0.017	0.014	0.011	0.010	0.011
-1	0.017	0.013	0.011	0.013	0.018
0	0.014	0.013	0.012	0.018	0.028
1	0.015	0.012	0.012	0.016	0.022
2	0.014	0.013	0.014	0.015	0.017
3	0.015	0.013	0.013	0.011	0.012
4	0.013	0.014	0.014	0.011	0.010
5	0.012	0.014	0.014	0.013	0.009
6	0.012	0.011	0.008	0.009	0.007
7	0.009	0.007	0.007	0.008	0.007
8	0.008	0.008	0.010	0.012	0.012
9	0.008	0.009	0.011	0.015	0.018
10	0.007	0.007	0.009	0.016	0.020
11	0.005	0.006	0.010	0.014	0.015
12	0.006	0.008	0.009	0.008	0.008
13	0.010	0.011	0.008	0.007	0.008
14	0.011	0.011	0.009	0.007	0.007
15	0.008	0.008	0.006	0.006	0.007
16	0.007	0.005	0.005	0.005	0.006
17	0.005	0.004	0.005	0.006	0.007
18	0.007	0.005	0.005	0.007	0.007
19	0.007	0.005	0.004	0.005	0.005
20	0.006	0.005	0.004	0.004	0.004

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.006
-19	0.006
-18	0.006
-17	0.007
-16	0.008
-15	0.008
-14	0.006
-13	0.006
-12	0.007
-11	0.009

-10	0.012
-9	0.019
-8	0.018
-7	0.014
-6	0.014
-5	0.016
-4	0.015
-3	0.013
-2	0.012
-1	0.019

0	0.032
1	0.024
2	0.015
3	0.010
4	0.010
5	0.010
6	0.007
7	0.006
8	0.010
9	0.016

10	0.018
11	0.013
12	0.008
13	0.007
14	0.007
15	0.008
16	0.008
17	0.007
18	0.007
19	0.006

20	0.005
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CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.052	0.052	0.067	0.076	0.064
-19	0.040	0.045	0.064	0.073	0.070
-18	0.045	0.056	0.057	0.066	0.073
-17	0.059	0.063	0.057	0.066	0.060
-16	0.061	0.062	0.068	0.066	0.054
-15	0.058	0.051	0.064	0.072	0.067
-14	0.068	0.056	0.073	0.081	0.068
-13	0.074	0.074	0.093	0.082	0.065
-12	0.068	0.066	0.077	0.078	0.072
-11	0.059	0.045	0.048	0.061	0.070
-10	0.050	0.049	0.055	0.061	0.066
-9	0.057	0.057	0.053	0.061	0.066
-8	0.058	0.052	0.043	0.054	0.061
-7	0.059	0.056	0.051	0.060	0.073
-6	0.087	0.100	0.100	0.102	0.093
-5	0.103	0.126	0.115	0.095	0.078
-4	0.155	0.182	0.137	0.080	0.059
-3	0.409	0.565	0.410	0.182	0.087
-2	2.140	2.301	1.419	0.580	0.179
-1	47.237	13.681	3.900	1.341	0.330
0		56.097	3.779	1.120	0.321
1	47.237	8.872	1.408	0.529	0.202
2	2.140	1.368	0.658	0.310	0.146
3	0.409	0.293	0.246	0.172	0.140
4	0.155	0.116	0.094	0.094	0.128
5	0.103	0.070	0.056	0.066	0.110
6	0.087	0.067	0.054	0.069	0.104
7	0.059	0.067	0.080	0.081	0.078
8	0.058	0.067	0.075	0.076	0.066
9	0.057	0.054	0.063	0.073	0.070
10	0.050	0.054	0.069	0.070	0.062
11	0.059	0.068	0.065	0.057	0.052
12	0.068	0.073	0.058	0.049	0.055
13	0.074	0.077	0.059	0.047	0.052
14	0.068	0.078	0.074	0.059	0.052
15	0.058	0.071	0.069	0.060	0.059
16	0.061	0.061	0.055	0.054	0.058
17	0.059	0.048	0.053	0.061	0.066
18	0.045	0.044	0.055	0.060	0.070
19	0.040	0.051	0.055	0.052	0.056
20	0.052	0.069	0.059	0.048	0.051

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.050	0.041	0.048	0.054	0.057
-19	0.062	0.051	0.049	0.054	0.061
-18	0.075	0.067	0.055	0.056	0.062
-17	0.062	0.061	0.053	0.055	0.057
-16	0.049	0.049	0.050	0.054	0.047
-15	0.063	0.068	0.061	0.054	0.046
-14	0.066	0.075	0.071	0.061	0.053
-13	0.057	0.068	0.078	0.072	0.060
-12	0.059	0.066	0.069	0.061	0.060
-11	0.067	0.063	0.055	0.056	0.064
-10	0.062	0.062	0.064	0.070	0.076
-9	0.057	0.064	0.060	0.061	0.063
-8	0.070	0.075	0.056	0.052	0.053
-7	0.083	0.084	0.064	0.054	0.065
-6	0.077	0.079	0.062	0.055	0.065
-5	0.077	0.076	0.056	0.060	0.063
-4	0.074	0.087	0.075	0.068	0.065
-3	0.084	0.100	0.095	0.086	0.086
-2	0.105	0.102	0.084	0.076	0.083
-1	0.141	0.137	0.102	0.082	0.077
0	0.163	0.150	0.104	0.099	0.094
1	0.109	0.089	0.078	0.085	0.093
2	0.087	0.071	0.076	0.078	0.093
3	0.113	0.085	0.072	0.061	0.070
4	0.124	0.096	0.071	0.057	0.063
5	0.112	0.086	0.069	0.059	0.059
6	0.099	0.070	0.063	0.061	0.053
7	0.080	0.082	0.076	0.069	0.063
8	0.071	0.082	0.071	0.062	0.066
9	0.077	0.079	0.063	0.049	0.056
10	0.075	0.081	0.060	0.047	0.057
11	0.061	0.068	0.062	0.062	0.062
12	0.056	0.058	0.077	0.072	0.055
13	0.050	0.049	0.071	0.068	0.057
14	0.048	0.047	0.060	0.066	0.068
15	0.054	0.056	0.057	0.058	0.063
16	0.056	0.058	0.054	0.049	0.048
17	0.058	0.052	0.055	0.055	0.048
18	0.061	0.051	0.057	0.057	0.057
19	0.051	0.044	0.051	0.054	0.054
20	0.050	0.045	0.050	0.052	0.050

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CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.058	0.060	0.059	0.064	0.060
-19	0.058	0.052	0.062	0.066	0.058
-18	0.056	0.046	0.057	0.056	0.045
-17	0.055	0.055	0.060	0.059	0.047
-16	0.048	0.062	0.068	0.069	0.071
-15	0.049	0.061	0.059	0.053	0.066
-14	0.055	0.069	0.057	0.046	0.050
-13	0.063	0.077	0.060	0.051	0.050
-12	0.054	0.053	0.043	0.042	0.057
-11	0.061	0.059	0.049	0.041	0.060
-10	0.066	0.067	0.061	0.050	0.057
-9	0.060	0.063	0.060	0.057	0.067
-8	0.057	0.060	0.053	0.048	0.059
-7	0.062	0.058	0.051	0.045	0.048
-6	0.061	0.052	0.046	0.053	0.052
-5	0.067	0.058	0.043	0.050	0.050
-4	0.070	0.067	0.062	0.058	0.057
-3	0.076	0.066	0.065	0.067	0.075
-2	0.073	0.062	0.066	0.071	0.081
-1	0.067	0.066	0.082	0.094	0.104
0	0.068	0.069	0.082	0.088	0.102
1	0.078	0.078	0.073	0.057	0.072
2	0.079	0.070	0.062	0.049	0.061
3	0.065	0.063	0.068	0.057	0.049
4	0.075	0.071	0.074	0.073	0.062
5	0.068	0.069	0.074	0.081	0.071
6	0.057	0.076	0.074	0.067	0.059
7	0.063	0.084	0.073	0.051	0.050
8	0.066	0.076	0.067	0.054	0.060
9	0.067	0.066	0.058	0.062	0.069
10	0.069	0.057	0.052	0.072	0.068
11	0.064	0.054	0.052	0.072	0.074
12	0.059	0.065	0.065	0.072	0.076
13	0.053	0.054	0.056	0.058	0.062
14	0.062	0.054	0.048	0.045	0.058
15	0.060	0.055	0.049	0.051	0.065
16	0.051	0.058	0.058	0.061	0.068
17	0.050	0.067	0.073	0.070	0.064
18	0.056	0.059	0.070	0.078	0.060
19	0.049	0.045	0.056	0.069	0.063
20	0.047	0.046	0.048	0.059	0.064

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.058	0.063	0.084	0.077	0.047
-19	0.061	0.061	0.071	0.067	0.047
-18	0.051	0.051	0.051	0.054	0.050
-17	0.049	0.054	0.053	0.058	0.058
-16	0.071	0.061	0.055	0.058	0.065
-15	0.074	0.063	0.057	0.067	0.072
-14	0.052	0.051	0.062	0.076	0.063
-13	0.041	0.048	0.071	0.069	0.050
-12	0.056	0.054	0.064	0.056	0.046
-11	0.069	0.066	0.066	0.055	0.045
-10	0.070	0.068	0.066	0.059	0.056
-9	0.075	0.066	0.063	0.068	0.064
-8	0.062	0.064	0.070	0.073	0.059
-7	0.054	0.062	0.061	0.065	0.061
-6	0.058	0.061	0.056	0.055	0.061
-5	0.052	0.057	0.064	0.060	0.064
-4	0.058	0.066	0.074	0.068	0.061
-3	0.065	0.054	0.061	0.064	0.059
-2	0.068	0.053	0.061	0.065	0.062
-1	0.085	0.064	0.075	0.079	0.081
0	0.090	0.074	0.076	0.076	0.100
1	0.080	0.075	0.068	0.071	0.093
2	0.070	0.068	0.061	0.075	0.091
3	0.050	0.060	0.066	0.078	0.082
4	0.055	0.070	0.082	0.080	0.066
5	0.063	0.083	0.092	0.075	0.050
6	0.063	0.075	0.066	0.056	0.047
7	0.067	0.068	0.062	0.080	0.071
8	0.076	0.071	0.068	0.088	0.083
9	0.075	0.070	0.069	0.072	0.076
10	0.060	0.058	0.063	0.065	0.061
11	0.063	0.054	0.057	0.063	0.064
12	0.069	0.065	0.058	0.058	0.065
13	0.074	0.090	0.072	0.057	0.052
14	0.073	0.076	0.058	0.048	0.048
15	0.067	0.054	0.052	0.058	0.060
16	0.065	0.061	0.065	0.072	0.072
17	0.054	0.059	0.069	0.071	0.072
18	0.044	0.051	0.060	0.062	0.064
19	0.055	0.059	0.066	0.071	0.075
20	0.062	0.061	0.066	0.075	0.079

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CORRECTED SPECTRUM, (F-STAR)

20

-20	0.044
-19	0.047
-18	0.052
-17	0.060
-16	0.070
-15	0.067
-14	0.049
-13	0.043
-12	0.047
-11	0.045

-10	0.056
-9	0.060
-8	0.050
-7	0.059
-6	0.069
-5	0.070
-4	0.060
-3	0.057
-2	0.060
-1	0.094

0	0.154
1	0.121
2	0.087
3	0.077
4	0.063
5	0.051
6	0.046
7	0.059
8	0.074
9	0.082

10	0.067
11	0.068
12	0.068
13	0.052
14	0.049
15	0.058
16	0.072
17	0.075
18	0.068
19	0.071

20	0.070
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CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.012	0.011	0.011	0.011	0.010
-19	0.010	0.011	0.012	0.011	0.009
-18	0.008	0.009	0.012	0.011	0.009
-17	0.008	0.008	0.008	0.009	0.009
-16	0.008	0.008	0.009	0.010	0.009
-15	0.008	0.009	0.011	0.011	0.009
-14	0.008	0.009	0.011	0.010	0.007
-13	0.008	0.010	0.012	0.011	0.008
-12	0.009	0.009	0.009	0.010	0.008
-11	0.008	0.010	0.010	0.010	0.009
-10	0.010	0.012	0.013	0.011	0.010
-9	0.010	0.012	0.014	0.012	0.013
-8	0.011	0.014	0.017	0.017	0.018
-7	0.016	0.016	0.020	0.024	0.021
-6	0.025	0.027	0.024	0.024	0.026
-5	0.039	0.045	0.031	0.021	0.024
-4	0.069	0.056	0.034	0.028	0.024
-3	0.186	0.142	0.085	0.065	0.041
-2	0.996	0.642	0.357	0.199	0.091
-1	22.739	5.864	1.262	0.416	0.153
0		27.566	2.048	0.473	0.174
1	22.739	6.287	1.152	0.265	0.107
2	0.996	0.755	0.356	0.125	0.068
3	0.186	0.206	0.171	0.095	0.058
4	0.069	0.080	0.083	0.076	0.054
5	0.039	0.036	0.036	0.040	0.039
6	0.025	0.029	0.029	0.034	0.031
7	0.016	0.023	0.026	0.034	0.028
8	0.011	0.015	0.023	0.028	0.021
9	0.010	0.010	0.017	0.024	0.018
10	0.010	0.010	0.014	0.019	0.016
11	0.008	0.009	0.014	0.016	0.011
12	0.009	0.010	0.015	0.014	0.012
13	0.008	0.009	0.012	0.014	0.018
14	0.008	0.008	0.009	0.012	0.016
15	0.008	0.008	0.009	0.009	0.010
16	0.008	0.009	0.009	0.008	0.007
17	0.008	0.010	0.010	0.009	0.008
18	0.008	0.010	0.010	0.008	0.007
19	0.010	0.010	0.009	0.007	0.006
20	0.012	0.012	0.011	0.008	0.006

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CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.008	0.007	0.007	0.008	0.008
-19	0.007	0.007	0.008	0.009	0.009
-18	0.008	0.008	0.010	0.012	0.010
-17	0.008	0.008	0.010	0.011	0.008
-16	0.008	0.008	0.008	0.007	0.005
-15	0.009	0.007	0.007	0.006	0.005
-14	0.008	0.008	0.010	0.009	0.007
-13	0.008	0.008	0.012	0.012	0.009
-12	0.008	0.008	0.010	0.011	0.010
-11	0.009	0.011	0.013	0.012	0.009
-10	0.011	0.012	0.013	0.013	0.011
-9	0.011	0.009	0.010	0.012	0.014
-8	0.013	0.009	0.010	0.011	0.015
-7	0.015	0.012	0.012	0.013	0.015
-6	0.021	0.018	0.015	0.018	0.016
-5	0.025	0.019	0.015	0.016	0.014
-4	0.024	0.020	0.014	0.012	0.013
-3	0.028	0.022	0.018	0.014	0.015
-2	0.051	0.038	0.027	0.018	0.018
-1	0.083	0.069	0.047	0.029	0.027
0	0.095	0.083	0.064	0.048	0.039
1	0.066	0.058	0.048	0.035	0.026
2	0.047	0.037	0.032	0.021	0.016
3	0.037	0.029	0.033	0.025	0.015
4	0.029	0.022	0.024	0.020	0.013
5	0.027	0.022	0.022	0.019	0.014
6	0.022	0.017	0.017	0.017	0.015
7	0.016	0.013	0.011	0.012	0.014
8	0.012	0.011	0.009	0.008	0.010
9	0.012	0.011	0.010	0.009	0.009
10	0.012	0.011	0.011	0.010	0.010
11	0.010	0.011	0.011	0.011	0.010
12	0.013	0.011	0.010	0.009	0.008
13	0.017	0.014	0.012	0.009	0.008
14	0.015	0.012	0.012	0.009	0.008
15	0.010	0.009	0.010	0.009	0.008
16	0.006	0.006	0.007	0.006	0.006
17	0.007	0.006	0.006	0.006	0.007
18	0.007	0.007	0.007	0.007	0.007
19	0.007	0.008	0.008	0.006	0.005
20	0.007	0.008	0.008	0.006	0.004

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CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.005	0.005	0.007	0.008	0.007
-19	0.007	0.007	0.007	0.008	0.008
-18	0.008	0.008	0.008	0.009	0.010
-17	0.006	0.006	0.007	0.008	0.010
-16	0.005	0.005	0.006	0.007	0.007
-15	0.006	0.008	0.009	0.009	0.008
-14	0.009	0.011	0.011	0.010	0.009
-13	0.012	0.012	0.011	0.009	0.008
-12	0.011	0.010	0.009	0.008	0.008
-11	0.009	0.012	0.011	0.009	0.008
-10	0.012	0.017	0.015	0.010	0.007
-9	0.014	0.014	0.014	0.010	0.007
-8	0.014	0.012	0.011	0.010	0.008
-7	0.014	0.013	0.009	0.008	0.009
-6	0.013	0.012	0.010	0.010	0.013
-5	0.011	0.012	0.014	0.013	0.014
-4	0.011	0.009	0.011	0.010	0.011
-3	0.012	0.009	0.008	0.009	0.013
-2	0.016	0.012	0.010	0.009	0.012
-1	0.022	0.019	0.018	0.017	0.020
0	0.029	0.029	0.034	0.033	0.029
1	0.022	0.022	0.027	0.027	0.020
2	0.014	0.012	0.012	0.012	0.011
3	0.015	0.013	0.010	0.010	0.010
4	0.018	0.018	0.012	0.009	0.011
5	0.014	0.014	0.011	0.009	0.010
6	0.012	0.010	0.010	0.010	0.010
7	0.013	0.009	0.008	0.011	0.011
8	0.013	0.010	0.007	0.009	0.010
9	0.012	0.011	0.008	0.007	0.008
10	0.011	0.010	0.008	0.008	0.008
11	0.009	0.007	0.006	0.008	0.008
12	0.007	0.005	0.005	0.008	0.009
13	0.008	0.007	0.007	0.009	0.009
14	0.008	0.008	0.008	0.008	0.007
15	0.007	0.007	0.008	0.009	0.005
16	0.006	0.006	0.007	0.008	0.006
17	0.008	0.007	0.007	0.008	0.007
18	0.010	0.009	0.007	0.007	0.008
19	0.007	0.007	0.007	0.008	0.008
20	0.005	0.006	0.007	0.008	0.008

SILL 2 GRID 'H

-112-

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.007	0.009	0.008	0.009	0.010
-19	0.007	0.008	0.009	0.009	0.008
-18	0.010	0.008	0.010	0.010	0.008
-17	0.012	0.010	0.010	0.010	0.009
-16	0.007	0.008	0.009	0.008	0.007
-15	0.007	0.007	0.008	0.007	0.007
-14	0.007	0.006	0.007	0.007	0.007
-13	0.006	0.006	0.007	0.007	0.007
-12	0.007	0.006	0.007	0.006	0.007
-11	0.007	0.007	0.007	0.007	0.008
-10	0.007	0.007	0.008	0.008	0.011
-9	0.007	0.008	0.008	0.008	0.010
-8	0.007	0.007	0.007	0.007	0.009
-7	0.008	0.007	0.007	0.007	0.008
-6	0.011	0.008	0.008	0.007	0.007
-5	0.012	0.009	0.009	0.007	0.006
-4	0.011	0.011	0.012	0.010	0.011
-3	0.011	0.013	0.016	0.013	0.013
-2	0.011	0.011	0.012	0.011	0.012
-1	0.021	0.019	0.015	0.012	0.020
0	0.028	0.025	0.019	0.016	0.032
1	0.017	0.014	0.012	0.014	0.023
2	0.010	0.010	0.010	0.014	0.013
3	0.010	0.010	0.013	0.015	0.011
4	0.012	0.011	0.014	0.015	0.010
5	0.011	0.011	0.013	0.014	0.011
6	0.010	0.011	0.011	0.011	0.010
7	0.010	0.010	0.010	0.009	0.006
8	0.011	0.010	0.009	0.009	0.008
9	0.010	0.010	0.008	0.009	0.011
10	0.009	0.009	0.008	0.008	0.011
11	0.007	0.008	0.009	0.008	0.009
12	0.008	0.009	0.010	0.008	0.006
13	0.009	0.009	0.010	0.007	0.006
14	0.007	0.010	0.011	0.008	0.007
15	0.005	0.007	0.008	0.007	0.009
16	0.005	0.005	0.006	0.006	0.009
17	0.007	0.006	0.006	0.007	0.008
18	0.008	0.007	0.007	0.007	0.008
19	0.008	0.007	0.007	0.007	0.007
20	0.007	0.007	0.007	0.008	0.007

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.011
-19	0.008
-18	0.007
-17	0.008
-16	0.006
-15	0.006
-14	0.007
-13	0.007
-12	0.009
-11	0.011

-10	0.013
-9	0.011
-8	0.008
-7	0.007
-6	0.007
-5	0.007
-4	0.013
-3	0.016
-2	0.013
-1	0.031

0	0.054
1	0.032
2	0.012
3	0.010
4	0.009
5	0.009
6	0.008
7	0.006
8	0.008
9	0.012

10	0.013
11	0.009
12	0.005
13	0.005
14	0.007
15	0.010
16	0.011
17	0.009
18	0.008
19	0.007

20	0.008
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HOOD 1 GRID N

-114-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.019	0.019	0.015	0.013	0.017
-19	0.017	0.016	0.014	0.012	0.015
-18	0.018	0.015	0.018	0.019	0.018
-17	0.020	0.013	0.013	0.014	0.014
-16	0.017	0.012	0.011	0.015	0.019
-15	0.014	0.013	0.013	0.010	0.011
-14	0.016	0.015	0.015	0.012	0.013
-13	0.017	0.018	0.016	0.014	0.017
-12	0.018	0.018	0.019	0.021	0.023
-11	0.022	0.019	0.024	0.027	0.022
-10	0.032	0.028	0.039	0.041	0.027
-9	0.035	0.037	0.065	0.064	0.041
-8	0.032	0.052	0.111	0.112	0.074
-7	0.035	0.069	0.130	0.127	0.083
-6	0.043	0.079	0.111	0.099	0.073
-5	0.063	0.083	0.079	0.049	0.034
-4	0.127	0.097	0.097	0.091	0.064
-3	0.249	0.176	0.157	0.102	0.084
-2	0.579	0.482	0.185	0.084	0.092
-1	-4.703	3.545	5.488	3.768	1.331
0		26.883	26.337	15.604	5.391
1	-4.703	4.268	10.098	8.039	3.276
2	0.579	0.427	0.286	0.249	0.173
3	0.249	0.216	0.122	0.055	0.040
4	0.127	0.111	0.074	0.058	0.044
5	0.063	0.057	0.064	0.080	0.069
6	0.043	0.041	0.047	0.059	0.053
7	0.035	0.037	0.043	0.064	0.064
8	0.032	0.034	0.032	0.038	0.045
9	0.035	0.036	0.031	0.034	0.044
10	0.032	0.032	0.028	0.026	0.031
11	0.022	0.023	0.026	0.027	0.026
12	0.018	0.018	0.018	0.017	0.016
13	0.017	0.015	0.014	0.012	0.012
14	0.016	0.016	0.012	0.008	0.010
15	0.014	0.015	0.014	0.011	0.016
16	0.017	0.017	0.012	0.009	0.013
17	0.020	0.023	0.016	0.014	0.015
18	0.018	0.022	0.015	0.011	0.013
19	0.017	0.017	0.013	0.012	0.017
20	0.019	0.017	0.010	0.006	0.011

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.020	0.017	0.013	0.014	0.014
-19	0.017	0.015	0.013	0.013	0.014
-18	0.016	0.017	0.016	0.012	0.015
-17	0.014	0.021	0.019	0.014	0.017
-16	0.017	0.023	0.023	0.015	0.013
-15	0.015	0.022	0.022	0.013	0.009
-14	0.015	0.018	0.021	0.015	0.011
-13	0.018	0.019	0.022	0.018	0.015
-12	0.021	0.020	0.022	0.021	0.019
-11	0.017	0.017	0.018	0.023	0.024
-10	0.021	0.016	0.016	0.018	0.021
-9	0.033	0.020	0.016	0.014	0.016
-8	0.043	0.027	0.024	0.020	0.018
-7	0.047	0.039	0.032	0.027	0.024
-6	0.052	0.046	0.040	0.044	0.044
-5	0.039	0.050	0.068	0.082	0.074
-4	0.079	0.131	0.165	0.136	0.077
-3	0.159	0.216	0.183	0.105	0.048
-2	0.134	0.139	0.096	0.056	0.039
-1	0.274	0.077	0.066	0.056	0.045
0	1.019	0.128	0.062	0.065	0.060
1	0.748	0.148	0.108	0.114	0.086
2	0.114	0.076	0.095	0.115	0.082
3	0.044	0.041	0.044	0.055	0.044
4	0.039	0.044	0.046	0.039	0.028
5	0.055	0.060	0.055	0.034	0.023
6	0.055	0.073	0.069	0.042	0.025
7	0.052	0.057	0.061	0.043	0.027
8	0.035	0.032	0.033	0.024	0.020
9	0.035	0.026	0.023	0.018	0.017
10	0.027	0.021	0.021	0.022	0.017
11	0.023	0.016	0.016	0.021	0.022
12	0.017	0.016	0.017	0.021	0.024
13	0.017	0.024	0.027	0.025	0.020
14	0.019	0.025	0.028	0.026	0.018
15	0.021	0.024	0.027	0.022	0.020
16	0.017	0.022	0.024	0.019	0.023
17	0.014	0.018	0.017	0.013	0.015
18	0.014	0.017	0.014	0.011	0.009
19	0.018	0.018	0.015	0.015	0.014
20	0.016	0.018	0.018	0.021	0.020

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.014	0.015	0.019	0.020	0.019
-19	0.015	0.013	0.014	0.020	0.020
-18	0.017	0.011	0.010	0.015	0.016
-17	0.019	0.014	0.012	0.013	0.012
-16	0.015	0.014	0.012	0.011	0.011
-15	0.010	0.014	0.016	0.013	0.011
-14	0.014	0.018	0.019	0.013	0.011
-13	0.020	0.023	0.016	0.011	0.010
-12	0.021	0.022	0.015	0.011	0.009
-11	0.019	0.018	0.015	0.014	0.011
-10	0.019	0.017	0.015	0.013	0.014
-9	0.018	0.019	0.017	0.016	0.022
-8	0.019	0.020	0.022	0.031	0.045
-7	0.025	0.024	0.027	0.051	0.072
-6	0.043	0.034	0.029	0.041	0.053
-5	0.058	0.036	0.023	0.024	0.030
-4	0.045	0.029	0.021	0.021	0.023
-3	0.034	0.031	0.028	0.022	0.019
-2	0.032	0.030	0.026	0.019	0.019
-1	0.036	0.033	0.030	0.024	0.028
0	0.058	0.041	0.033	0.035	0.039
1	0.067	0.036	0.023	0.030	0.030
2	0.054	0.028	0.017	0.022	0.023
3	0.030	0.023	0.017	0.018	0.021
4	0.020	0.017	0.013	0.013	0.017
5	0.019	0.014	0.011	0.012	0.015
6	0.018	0.012	0.012	0.016	0.019
7	0.016	0.014	0.015	0.018	0.024
8	0.017	0.018	0.019	0.020	0.028
9	0.023	0.027	0.026	0.025	0.026
10	0.022	0.032	0.034	0.029	0.026
11	0.020	0.026	0.032	0.028	0.026
12	0.024	0.022	0.025	0.027	0.028
13	0.026	0.029	0.024	0.026	0.029
14	0.021	0.028	0.022	0.022	0.022
15	0.019	0.017	0.014	0.014	0.012
16	0.025	0.017	0.012	0.013	0.013
17	0.020	0.019	0.015	0.014	0.014
18	0.011	0.014	0.016	0.015	0.014
19	0.012	0.013	0.015	0.014	0.012
20	0.014	0.014	0.017	0.016	0.012

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.015	0.010	0.008	0.010	0.014
-19	0.014	0.009	0.008	0.009	0.012
-18	0.011	0.009	0.009	0.010	0.011
-17	0.011	0.011	0.010	0.012	0.013
-16	0.010	0.010	0.010	0.014	0.014
-15	0.008	0.009	0.013	0.015	0.012
-14	0.010	0.011	0.015	0.016	0.015
-13	0.011	0.013	0.015	0.018	0.018
-12	0.010	0.011	0.014	0.016	0.014
-11	0.010	0.011	0.014	0.014	0.014
-10	0.018	0.025	0.025	0.022	0.019
-9	0.054	0.090	0.090	0.054	0.023
-8	0.088	0.120	0.097	0.046	0.020
-7	0.073	0.057	0.034	0.017	0.016
-6	0.037	0.022	0.019	0.014	0.013
-5	0.026	0.025	0.025	0.020	0.015
-4	0.025	0.025	0.024	0.021	0.016
-3	0.021	0.021	0.019	0.017	0.016
-2	0.024	0.023	0.019	0.016	0.015
-1	0.031	0.028	0.029	0.029	0.028
0	0.034	0.034	0.040	0.044	0.042
1	0.025	0.031	0.030	0.031	0.027
2	0.024	0.032	0.030	0.023	0.018
3	0.028	0.034	0.030	0.025	0.027
4	0.021	0.025	0.025	0.024	0.030
5	0.016	0.018	0.021	0.018	0.016
6	0.020	0.020	0.023	0.019	0.013
7	0.025	0.019	0.016	0.015	0.014
8	0.029	0.021	0.013	0.013	0.017
9	0.027	0.022	0.014	0.015	0.018
10	0.026	0.022	0.017	0.016	0.019
11	0.025	0.026	0.022	0.019	0.023
12	0.025	0.028	0.024	0.020	0.022
13	0.026	0.024	0.019	0.014	0.015
14	0.020	0.017	0.013	0.011	0.012
15	0.011	0.010	0.011	0.012	0.012
16	0.012	0.013	0.016	0.018	0.018
17	0.014	0.014	0.018	0.020	0.021
18	0.013	0.014	0.018	0.020	0.019
19	0.013	0.017	0.020	0.020	0.016
20	0.013	0.019	0.023	0.020	0.016

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.013
-19	0.013
-18	0.012
-17	0.012
-16	0.011
-15	0.011
-14	0.013
-13	0.015
-12	0.013
-11	0.015

-10	0.018
-9	0.014
-8	0.018
-7	0.020
-6	0.014
-5	0.013
-4	0.013
-3	0.015
-2	0.015
-1	0.024

0	0.036
1	0.025
2	0.018
3	0.024
4	0.026
5	0.015
6	0.014
7	0.017
8	0.020
9	0.018

10	0.020
11	0.024
12	0.021
13	0.017
14	0.013
15	0.013
16	0.018
17	0.021
18	0.019
19	0.015

20	0.014
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CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.004	0.003	0.003	0.002	0.002
-19	0.004	0.003	0.003	0.002	0.002
-18	0.004	0.003	0.003	0.003	0.002
-17	0.004	0.003	0.003	0.003	0.004
-16	0.003	0.003	0.003	0.004	0.004
-15	0.004	0.003	0.003	0.003	0.004
-14	0.004	0.003	0.002	0.003	0.003
-13	0.003	0.002	0.002	0.003	0.003
-12	0.002	0.002	0.003	0.003	0.003
-11	0.003	0.003	0.003	0.004	0.004
-10	0.003	0.003	0.003	0.004	0.005
-9	0.003	0.003	0.004	0.006	0.007
-8	0.003	0.004	0.005	0.007	0.010
-7	0.004	0.005	0.005	0.008	0.011
-6	0.005	0.006	0.006	0.008	0.013
-5	0.006	0.007	0.006	0.009	0.015
-4	0.008	0.008	0.005	0.008	0.014
-3	0.014	0.014	0.013	0.012	0.012
-2	0.088	0.097	0.045	0.020	0.011
-1	2.279	0.906	0.131	0.030	0.015
0		2.905	0.158	0.032	0.018
1	2.279	0.384	0.073	0.025	0.013
2	0.088	0.047	0.024	0.016	0.009
3	0.014	0.014	0.010	0.010	0.007
4	0.008	0.008	0.007	0.007	0.005
5	0.006	0.006	0.006	0.005	0.004
6	0.005	0.005	0.005	0.004	0.004
7	0.004	0.003	0.003	0.003	0.004
8	0.003	0.003	0.003	0.003	0.004
9	0.003	0.003	0.004	0.003	0.003
10	0.003	0.003	0.004	0.003	0.002
11	0.003	0.003	0.003	0.002	0.002
12	0.002	0.003	0.003	0.002	0.002
13	0.003	0.003	0.003	0.002	0.002
14	0.004	0.004	0.003	0.002	0.002
15	0.004	0.004	0.003	0.002	0.002
16	0.003	0.004	0.003	0.002	0.002
17	0.004	0.004	0.003	0.003	0.003
18	0.004	0.004	0.003	0.002	0.003
19	0.004	0.005	0.004	0.002	0.003
20	0.004	0.005	0.004	0.003	0.002

HOOD 2 GRID 0

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CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.002	0.003	0.003	0.003	0.003
-19	0.003	0.003	0.003	0.002	0.003
-18	0.004	0.004	0.003	0.002	0.003
-17	0.004	0.004	0.003	0.003	0.004
-16	0.004	0.003	0.004	0.004	0.004
-15	0.004	0.004	0.004	0.004	0.004
-14	0.005	0.004	0.004	0.004	0.005
-13	0.004	0.004	0.005	0.005	0.006
-12	0.003	0.003	0.004	0.005	0.006
-11	0.003	0.002	0.003	0.004	0.005
-10	0.004	0.003	0.003	0.004	0.005
-9	0.006	0.006	0.005	0.005	0.006
-8	0.009	0.008	0.007	0.006	0.005
-7	0.011	0.012	0.012	0.008	0.007
-6	0.017	0.018	0.014	0.009	0.007
-5	0.024	0.020	0.010	0.007	0.006
-4	0.018	0.011	0.005	0.005	0.005
-3	0.009	0.005	0.006	0.007	0.006
-2	0.008	0.007	0.008	0.009	0.008
-1	0.010	0.008	0.009	0.009	0.008
0	0.012	0.008	0.008	0.009	0.007
1	0.008	0.005	0.005	0.006	0.005
2	0.005	0.004	0.004	0.004	0.004
3	0.005	0.004	0.004	0.004	0.004
4	0.003	0.003	0.003	0.003	0.005
5	0.003	0.002	0.003	0.004	0.004
6	0.003	0.003	0.003	0.004	0.004
7	0.004	0.003	0.003	0.004	0.004
8	0.004	0.003	0.003	0.003	0.003
9	0.003	0.003	0.002	0.003	0.003
10	0.003	0.003	0.003	0.003	0.003
11	0.003	0.003	0.003	0.004	0.004
12	0.002	0.002	0.003	0.003	0.003
13	0.002	0.002	0.002	0.002	0.003
14	0.002	0.002	0.002	0.003	0.003
15	0.002	0.002	0.002	0.003	0.002
16	0.003	0.002	0.002	0.003	0.003
17	0.003	0.003	0.002	0.003	0.003
18	0.003	0.003	0.002	0.002	0.003
19	0.003	0.002	0.002	0.002	0.003
20	0.002	0.002	0.002	0.002	0.003

HOOD 2 GRID 0

-121-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.002	0.002	0.003	0.003	0.004
-19	0.003	0.003	0.003	0.003	0.004
-18	0.004	0.004	0.003	0.003	0.003
-17	0.004	0.004	0.003	0.002	0.002
-16	0.004	0.004	0.004	0.003	0.003
-15	0.005	0.005	0.005	0.003	0.003
-14	0.005	0.006	0.006	0.005	0.003
-13	0.007	0.008	0.008	0.006	0.004
-12	0.008	0.008	0.009	0.008	0.005
-11	0.006	0.006	0.008	0.009	0.007
-10	0.005	0.005	0.006	0.007	0.008
-9	0.005	0.004	0.004	0.006	0.007
-8	0.004	0.003	0.004	0.004	0.005
-7	0.005	0.003	0.003	0.003	0.004
-6	0.005	0.004	0.004	0.003	0.003
-5	0.003	0.004	0.005	0.004	0.003
-4	0.004	0.004	0.005	0.005	0.004
-3	0.006	0.005	0.004	0.004	0.004
-2	0.007	0.005	0.005	0.004	0.003
-1	0.006	0.005	0.006	0.004	0.003
0	0.004	0.004	0.005	0.005	0.004
1	0.005	0.004	0.003	0.003	0.004
2	0.005	0.005	0.003	0.003	0.004
3	0.005	0.005	0.003	0.003	0.003
4	0.005	0.004	0.003	0.002	0.003
5	0.004	0.003	0.002	0.002	0.003
6	0.004	0.004	0.003	0.002	0.003
7	0.006	0.005	0.003	0.002	0.002
8	0.004	0.004	0.003	0.002	0.003
9	0.003	0.003	0.003	0.002	0.002
10	0.003	0.003	0.003	0.002	0.002
11	0.003	0.003	0.003	0.002	0.002
12	0.003	0.003	0.003	0.002	0.002
13	0.002	0.002	0.002	0.002	0.002
14	0.003	0.003	0.003	0.002	0.002
15	0.003	0.003	0.004	0.003	0.003
16	0.003	0.004	0.004	0.003	0.003
17	0.003	0.003	0.003	0.003	0.002
18	0.003	0.003	0.003	0.003	0.003
19	0.004	0.004	0.004	0.003	0.002
20	0.004	0.004	0.004	0.003	0.002

HOOD 2 GRID 0

-122-

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.004	0.004	0.004	0.005	0.004
-19	0.004	0.004	0.004	0.004	0.004
-18	0.003	0.003	0.003	0.003	0.004
-17	0.002	0.003	0.003	0.003	0.003
-16	0.003	0.003	0.003	0.003	0.004
-15	0.003	0.003	0.003	0.004	0.004
-14	0.003	0.003	0.003	0.003	0.004
-13	0.004	0.003	0.003	0.003	0.003
-12	0.004	0.003	0.002	0.002	0.002
-11	0.004	0.002	0.002	0.003	0.002
-10	0.005	0.004	0.004	0.003	0.003
-9	0.005	0.005	0.005	0.003	0.002
-8	0.004	0.004	0.004	0.003	0.003
-7	0.003	0.003	0.003	0.003	0.003
-6	0.003	0.004	0.004	0.003	0.002
-5	0.003	0.005	0.005	0.003	0.002
-4	0.004	0.003	0.003	0.003	0.004
-3	0.004	0.003	0.003	0.004	0.005
-2	0.004	0.004	0.003	0.005	0.005
-1	0.004	0.004	0.004	0.004	0.007
0	0.003	0.004	0.004	0.005	0.012
1	0.003	0.003	0.004	0.004	0.008
2	0.003	0.003	0.003	0.003	0.004
3	0.003	0.003	0.002	0.003	0.004
4	0.003	0.002	0.002	0.002	0.003
5	0.003	0.002	0.002	0.003	0.003
6	0.004	0.002	0.002	0.004	0.004
7	0.003	0.002	0.003	0.003	0.003
8	0.003	0.003	0.003	0.003	0.002
9	0.002	0.003	0.004	0.003	0.002
10	0.003	0.004	0.004	0.003	0.002
11	0.003	0.004	0.004	0.003	0.002
12	0.002	0.003	0.003	0.003	0.003
13	0.002	0.002	0.002	0.002	0.003
14	0.002	0.002	0.002	0.003	0.003
15	0.003	0.003	0.003	0.003	0.003
16	0.003	0.003	0.003	0.002	0.002
17	0.003	0.003	0.002	0.002	0.002
18	0.003	0.002	0.003	0.003	0.002
19	0.002	0.003	0.003	0.003	0.003
20	0.002	0.003	0.003	0.003	0.003

HOOD 2 GRID 0

-123-

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.003
-19	0.003
-18	0.004
-17	0.004
-16	0.004
-15	0.005
-14	0.005
-13	0.003
-12	0.002
-11	0.002

-10	0.002
-9	0.002
-8	0.002
-7	0.002
-6	0.002
-5	0.003
-4	0.005
-3	0.006
-2	0.004
-1	0.011

0	0.020
1	0.012
2	0.005
3	0.004
4	0.003
5	0.003
6	0.003
7	0.002
8	0.002
9	0.002

10	0.002
11	0.003
12	0.003
13	0.003
14	0.004
15	0.004
16	0.003
17	0.002
18	0.002
19	0.003

20	0.003
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POLK 1 GRID P

-124-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.006	0.005	0.004	0.004	0.005
-19	0.006	0.005	0.005	0.005	0.005
-18	0.008	0.007	0.005	0.005	0.005
-17	0.009	0.010	0.009	0.008	0.007
-16	0.008	0.009	0.010	0.010	0.010
-15	0.007	0.009	0.010	0.010	0.012
-14	0.008	0.008	0.009	0.012	0.014
-13	0.013	0.012	0.010	0.013	0.013
-12	0.020	0.015	0.010	0.011	0.010
-11	0.025	0.018	0.013	0.014	0.013
-10	0.034	0.026	0.025	0.024	0.020
-9	0.044	0.043	0.042	0.032	0.025
-8	0.058	0.059	0.057	0.049	0.035
-7	0.095	0.091	0.094	0.086	0.060
-6	0.109	0.107	0.097	0.080	0.067
-5	0.099	0.094	0.081	0.070	0.068
-4	0.123	0.123	0.127	0.114	0.089
-3	0.223	0.195	0.220	0.199	0.124
-2	0.818	0.415	0.333	0.272	0.186
-1	12.616	2.548	0.689	0.425	0.270
0		11.042	0.811	0.381	0.263
1	12.616	3.320	0.543	0.254	0.181
2	0.818	0.824	0.394	0.194	0.129
3	0.223	0.300	0.236	0.141	0.093
4	0.123	0.147	0.138	0.097	0.071
5	0.099	0.120	0.130	0.106	0.068
6	0.109	0.120	0.116	0.093	0.064
7	0.095	0.097	0.084	0.075	0.061
8	0.058	0.056	0.056	0.061	0.050
9	0.044	0.047	0.042	0.045	0.036
10	0.034	0.039	0.033	0.030	0.024
11	0.025	0.026	0.023	0.018	0.016
12	0.020	0.018	0.017	0.014	0.013
13	0.013	0.012	0.011	0.011	0.012
14	0.008	0.008	0.008	0.010	0.010
15	0.007	0.005	0.007	0.009	0.009
16	0.008	0.006	0.008	0.008	0.007
17	0.009	0.007	0.008	0.008	0.007
18	0.008	0.009	0.009	0.009	0.008
19	0.006	0.008	0.008	0.007	0.008
20	0.006	0.007	0.007	0.008	0.008

POLK 1 GRID P

-125-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.005	0.005	0.006	0.005	0.005
-19	0.005	0.006	0.006	0.005	0.005
-18	0.007	0.008	0.006	0.004	0.005
-17	0.007	0.009	0.008	0.005	0.006
-16	0.011	0.010	0.008	0.006	0.007
-15	0.012	0.009	0.006	0.005	0.006
-14	0.012	0.008	0.007	0.005	0.004
-13	0.011	0.008	0.007	0.006	0.005
-12	0.010	0.009	0.008	0.006	0.007
-11	0.011	0.012	0.012	0.009	0.009
-10	0.016	0.015	0.014	0.011	0.010
-9	0.018	0.018	0.016	0.013	0.010
-8	0.026	0.027	0.022	0.015	0.013
-7	0.043	0.036	0.023	0.017	0.015
-6	0.052	0.041	0.026	0.023	0.019
-5	0.062	0.055	0.041	0.036	0.029
-4	0.075	0.070	0.054	0.040	0.033
-3	0.073	0.068	0.052	0.032	0.028
-2	0.104	0.066	0.041	0.028	0.028
-1	0.151	0.078	0.045	0.037	0.035
0	0.164	0.088	0.051	0.045	0.044
1	0.129	0.084	0.057	0.052	0.042
2	0.086	0.060	0.052	0.051	0.038
3	0.063	0.044	0.045	0.048	0.037
4	0.060	0.050	0.048	0.041	0.026
5	0.050	0.048	0.041	0.023	0.012
6	0.043	0.032	0.027	0.017	0.010
7	0.037	0.023	0.020	0.017	0.015
8	0.031	0.021	0.016	0.013	0.014
9	0.026	0.018	0.015	0.010	0.010
10	0.022	0.017	0.014	0.009	0.007
11	0.020	0.018	0.012	0.009	0.007
12	0.015	0.015	0.009	0.007	0.007
13	0.010	0.009	0.006	0.006	0.007
14	0.007	0.007	0.007	0.007	0.008
15	0.007	0.008	0.009	0.006	0.005
16	0.007	0.009	0.009	0.006	0.005
17	0.008	0.008	0.007	0.006	0.006
18	0.008	0.008	0.006	0.005	0.005
19	0.008	0.007	0.005	0.004	0.004
20	0.007	0.006	0.005	0.004	0.005

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.004	0.004	0.005	0.006	0.006
-19	0.005	0.005	0.006	0.006	0.006
-18	0.006	0.005	0.006	0.007	0.006
-17	0.006	0.005	0.005	0.007	0.008
-16	0.006	0.005	0.005	0.007	0.006
-15	0.006	0.004	0.005	0.006	0.005
-14	0.005	0.005	0.005	0.006	0.006
-13	0.006	0.007	0.006	0.006	0.007
-12	0.007	0.007	0.007	0.008	0.009
-11	0.010	0.009	0.008	0.008	0.009
-10	0.011	0.011	0.009	0.008	0.008
-9	0.010	0.009	0.008	0.008	0.009
-8	0.013	0.010	0.008	0.008	0.009
-7	0.013	0.011	0.009	0.008	0.010
-6	0.012	0.011	0.011	0.009	0.011
-5	0.018	0.016	0.016	0.011	0.009
-4	0.026	0.021	0.020	0.014	0.009
-3	0.025	0.019	0.015	0.012	0.008
-2	0.028	0.020	0.013	0.013	0.012
-1	0.037	0.028	0.020	0.020	0.017
0	0.040	0.035	0.029	0.026	0.019
1	0.032	0.028	0.028	0.025	0.017
2	0.025	0.018	0.016	0.016	0.015
3	0.027	0.019	0.011	0.011	0.013
4	0.018	0.015	0.010	0.010	0.010
5	0.011	0.010	0.009	0.009	0.008
6	0.012	0.014	0.011	0.008	0.008
7	0.016	0.015	0.011	0.008	0.008
8	0.014	0.011	0.008	0.008	0.009
9	0.011	0.010	0.007	0.008	0.009
10	0.008	0.010	0.007	0.006	0.006
11	0.008	0.011	0.008	0.006	0.006
12	0.006	0.007	0.009	0.009	0.008
13	0.006	0.005	0.007	0.008	0.007
14	0.007	0.006	0.007	0.007	0.006
15	0.006	0.007	0.006	0.005	0.004
16	0.005	0.005	0.005	0.004	0.004
17	0.005	0.005	0.005	0.005	0.006
18	0.004	0.004	0.005	0.005	0.005
19	0.004	0.005	0.006	0.005	0.005
20	0.005	0.005	0.006	0.005	0.005

POLK 1 GRID P

-127-

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.005	0.004	0.005	0.007	0.007
-19	0.005	0.004	0.005	0.006	0.006
-18	0.005	0.004	0.004	0.005	0.006
-17	0.006	0.005	0.004	0.005	0.007
-16	0.006	0.006	0.007	0.007	0.007
-15	0.005	0.006	0.008	0.009	0.008
-14	0.005	0.006	0.008	0.009	0.008
-13	0.006	0.006	0.007	0.009	0.008
-12	0.008	0.005	0.006	0.007	0.007
-11	0.007	0.006	0.007	0.007	0.006
-10	0.006	0.006	0.007	0.007	0.006
-9	0.008	0.007	0.006	0.006	0.006
-8	0.008	0.007	0.006	0.006	0.007
-7	0.009	0.008	0.008	0.009	0.009
-6	0.011	0.009	0.010	0.012	0.012
-5	0.010	0.009	0.008	0.010	0.011
-4	0.009	0.008	0.007	0.008	0.009
-3	0.008	0.008	0.007	0.009	0.011
-2	0.011	0.011	0.009	0.010	0.013
-1	0.015	0.018	0.016	0.016	0.027
0	0.015	0.022	0.022	0.021	0.040
1	0.014	0.018	0.019	0.018	0.028
2	0.013	0.013	0.014	0.014	0.014
3	0.012	0.009	0.010	0.010	0.011
4	0.011	0.009	0.008	0.007	0.007
5	0.010	0.010	0.008	0.007	0.006
6	0.010	0.011	0.009	0.009	0.009
7	0.010	0.010	0.009	0.010	0.010
8	0.009	0.008	0.008	0.011	0.009
9	0.010	0.009	0.007	0.008	0.008
10	0.010	0.010	0.006	0.005	0.007
11	0.008	0.009	0.007	0.005	0.006
12	0.006	0.006	0.007	0.007	0.006
13	0.006	0.007	0.007	0.006	0.005
14	0.006	0.007	0.007	0.006	0.006
15	0.005	0.005	0.006	0.006	0.006
16	0.004	0.005	0.006	0.007	0.007
17	0.005	0.005	0.007	0.007	0.006
18	0.006	0.006	0.006	0.005	0.006
19	0.006	0.006	0.006	0.005	0.006
20	0.006	0.006	0.006	0.005	0.006

POLK 1 GRID P

-128-

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.006
-19	0.006
-18	0.007
-17	0.007
-16	0.007
-15	0.006
-14	0.006
-13	0.007
-12	0.007
-11	0.006

-10	0.005
-9	0.006
-8	0.007
-7	0.010
-6	0.013
-5	0.010
-4	0.009
-3	0.012
-2	0.016
-1	0.047

0	0.081
1	0.047
2	0.017
3	0.012
4	0.008
5	0.006
6	0.007
7	0.008
8	0.006
9	0.006

10	0.007
11	0.007
12	0.006
13	0.006
14	0.006
15	0.006
16	0.007
17	0.006
18	0.007
19	0.007

20	0.006
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POLK 2 GRID Q

-129-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.016	0.014	0.017	0.016	0.014
-19	0.015	0.013	0.018	0.017	0.014
-18	0.012	0.010	0.016	0.019	0.018
-17	0.010	0.010	0.016	0.017	0.020
-16	0.013	0.015	0.018	0.015	0.014
-15	0.014	0.016	0.018	0.016	0.015
-14	0.013	0.014	0.017	0.015	0.018
-13	0.016	0.018	0.018	0.015	0.015
-12	0.024	0.033	0.032	0.023	0.017
-11	0.052	0.066	0.065	0.043	0.025
-10	0.085	0.108	0.098	0.066	0.046
-9	0.084	0.130	0.128	0.092	0.066
-8	0.099	0.156	0.174	0.143	0.081
-7	0.150	0.190	0.185	0.157	0.095
-6	0.309	0.301	0.188	0.127	0.108
-5	0.595	0.632	0.349	0.151	0.116
-4	0.979	1.079	0.597	0.231	0.122
-3	2.305	1.855	0.637	0.222	0.124
-2	7.340	4.250	0.739	0.255	0.163
-1	63.870	12.869	0.828	0.377	0.261
0		35.836	1.144	0.441	0.265
1	63.870	8.780	1.027	0.391	0.178
2	7.340	3.098	1.108	0.450	0.201
3	2.305	1.308	0.663	0.316	0.162
4	0.979	0.472	0.285	0.213	0.137
5	0.595	0.254	0.143	0.149	0.113
6	0.309	0.150	0.095	0.108	0.090
7	0.150	0.076	0.065	0.074	0.076
8	0.099	0.051	0.048	0.051	0.055
9	0.084	0.047	0.054	0.062	0.045
10	0.085	0.048	0.054	0.067	0.041
11	0.052	0.036	0.038	0.043	0.030
12	0.024	0.021	0.024	0.024	0.020
13	0.016	0.017	0.020	0.022	0.021
14	0.013	0.016	0.016	0.017	0.017
15	0.014	0.015	0.014	0.013	0.013
16	0.013	0.013	0.013	0.013	0.012
17	0.010	0.012	0.011	0.011	0.010
18	0.012	0.013	0.013	0.011	0.008
19	0.015	0.014	0.013	0.014	0.012
20	0.016	0.014	0.012	0.014	0.015

POLK 2 GRID Q

-130-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.013	0.008	0.006	0.007	0.007
-19	0.013	0.008	0.006	0.007	0.007
-18	0.016	0.010	0.005	0.008	0.009
-17	0.020	0.012	0.008	0.011	0.012
-16	0.016	0.013	0.012	0.015	0.015
-15	0.017	0.016	0.014	0.017	0.019
-14	0.019	0.016	0.015	0.019	0.019
-13	0.017	0.019	0.020	0.023	0.022
-12	0.018	0.022	0.021	0.027	0.030
-11	0.019	0.019	0.020	0.031	0.034
-10	0.034	0.026	0.024	0.030	0.029
-9	0.049	0.044	0.045	0.037	0.028
-8	0.057	0.062	0.060	0.047	0.037
-7	0.069	0.071	0.068	0.050	0.042
-6	0.096	0.090	0.067	0.044	0.044
-5	0.106	0.098	0.065	0.043	0.050
-4	0.101	0.083	0.074	0.071	0.071
-3	0.120	0.100	0.085	0.080	0.078
-2	0.146	0.123	0.088	0.074	0.073
-1	0.158	0.125	0.094	0.080	0.077
0	0.131	0.100	0.076	0.069	0.070
1	0.106	0.086	0.059	0.064	0.064
2	0.144	0.106	0.068	0.074	0.073
3	0.133	0.100	0.066	0.064	0.067
4	0.121	0.097	0.072	0.063	0.064
5	0.105	0.103	0.080	0.065	0.056
6	0.092	0.089	0.061	0.048	0.041
7	0.067	0.077	0.041	0.041	0.039
8	0.060	0.063	0.049	0.035	0.032
9	0.035	0.042	0.043	0.029	0.019
10	0.027	0.029	0.033	0.027	0.016
11	0.025	0.023	0.025	0.024	0.018
12	0.019	0.018	0.020	0.022	0.018
13	0.018	0.017	0.019	0.022	0.019
14	0.015	0.014	0.017	0.018	0.017
15	0.012	0.011	0.013	0.015	0.013
16	0.009	0.008	0.012	0.014	0.011
17	0.008	0.007	0.008	0.009	0.007
18	0.007	0.006	0.006	0.006	0.005
19	0.009	0.007	0.007	0.008	0.005
20	0.012	0.008	0.009	0.010	0.006

POLK 2 GRID Q

-131-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.007	0.007	0.006	0.006	0.005
-19	0.007	0.007	0.006	0.006	0.005
-18	0.008	0.008	0.007	0.006	0.005
-17	0.010	0.009	0.008	0.007	0.006
-16	0.014	0.012	0.010	0.009	0.007
-15	0.015	0.013	0.010	0.008	0.007
-14	0.016	0.017	0.013	0.008	0.006
-13	0.021	0.020	0.013	0.010	0.008
-12	0.031	0.025	0.014	0.011	0.008
-11	0.030	0.024	0.018	0.017	0.011
-10	0.024	0.023	0.023	0.023	0.017
-9	0.021	0.025	0.028	0.024	0.020
-8	0.026	0.039	0.043	0.026	0.018
-7	0.037	0.053	0.057	0.030	0.020
-6	0.048	0.059	0.060	0.034	0.024
-5	0.062	0.065	0.051	0.032	0.023
-4	0.100	0.092	0.046	0.025	0.020
-3	0.103	0.092	0.043	0.021	0.018
-2	0.068	0.053	0.031	0.018	0.019
-1	0.055	0.036	0.024	0.019	0.022
0	0.050	0.032	0.026	0.023	0.025
1	0.041	0.028	0.028	0.030	0.034
2	0.051	0.035	0.027	0.027	0.036
3	0.057	0.042	0.026	0.021	0.027
4	0.057	0.045	0.031	0.020	0.020
5	0.043	0.043	0.039	0.022	0.015
6	0.031	0.030	0.033	0.018	0.011
7	0.031	0.024	0.027	0.018	0.012
8	0.026	0.023	0.022	0.015	0.014
9	0.019	0.025	0.022	0.014	0.013
10	0.012	0.019	0.021	0.013	0.010
11	0.012	0.016	0.016	0.010	0.009
12	0.014	0.014	0.013	0.011	0.011
13	0.015	0.013	0.011	0.011	0.012
14	0.013	0.009	0.008	0.009	0.010
15	0.008	0.007	0.008	0.010	0.010
16	0.007	0.006	0.006	0.008	0.009
17	0.006	0.006	0.005	0.005	0.007
18	0.005	0.005	0.005	0.005	0.007
19	0.004	0.005	0.005	0.005	0.006
20	0.004	0.005	0.005	0.005	0.005

POLK 2 GRID Q

-132-

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.006	0.005	0.004	0.004	0.004
-19	0.005	0.004	0.004	0.005	0.005
-18	0.004	0.004	0.005	0.006	0.007
-17	0.005	0.005	0.006	0.006	0.007
-16	0.007	0.006	0.007	0.006	0.008
-15	0.006	0.006	0.007	0.007	0.010
-14	0.006	0.006	0.007	0.009	0.012
-13	0.007	0.007	0.007	0.012	0.015
-12	0.008	0.009	0.009	0.016	0.018
-11	0.010	0.012	0.012	0.016	0.017
-10	0.015	0.015	0.019	0.021	0.015
-9	0.021	0.019	0.025	0.028	0.015
-8	0.021	0.020	0.025	0.024	0.016
-7	0.020	0.021	0.026	0.021	0.015
-6	0.022	0.026	0.031	0.020	0.012
-5	0.024	0.030	0.029	0.016	0.012
-4	0.025	0.029	0.026	0.016	0.014
-3	0.021	0.023	0.023	0.015	0.013
-2	0.022	0.023	0.020	0.014	0.016
-1	0.026	0.023	0.018	0.016	0.024
0	0.024	0.019	0.016	0.019	0.025
1	0.023	0.015	0.014	0.019	0.022
2	0.025	0.016	0.013	0.016	0.017
3	0.022	0.018	0.015	0.018	0.015
4	0.017	0.018	0.018	0.021	0.015
5	0.014	0.019	0.022	0.021	0.016
6	0.013	0.018	0.020	0.017	0.015
7	0.013	0.014	0.016	0.015	0.014
8	0.013	0.011	0.011	0.010	0.012
9	0.013	0.011	0.011	0.010	0.015
10	0.010	0.009	0.010	0.011	0.018
11	0.007	0.008	0.009	0.010	0.019
12	0.009	0.011	0.010	0.011	0.017
13	0.011	0.013	0.011	0.012	0.016
14	0.012	0.013	0.010	0.010	0.011
15	0.012	0.012	0.009	0.008	0.008
16	0.010	0.009	0.006	0.006	0.006
17	0.011	0.009	0.005	0.005	0.006
18	0.010	0.009	0.006	0.005	0.005
19	0.008	0.008	0.006	0.005	0.004
20	0.007	0.008	0.006	0.004	0.003

POLK 2 GRID Q

-133-

CORRECTED SPECTRUM, (F-STAR)

20

-20 0.004

-19 0.005

-18 0.007

-17 0.007

-16 0.009

-15 0.011

-14 0.013

-13 0.013

-12 0.015

-11 0.014

-10 0.011

-9 0.010

-8 0.014

-7 0.018

-6 0.015

-5 0.014

-4 0.014

-3 0.013

-2 0.018

-1 0.026

0 0.026

1 0.019

2 0.014

3 0.012

4 0.012

5 0.015

6 0.018

7 0.018

8 0.016

9 0.020

10 0.024

11 0.024

12 0.019

13 0.016

14 0.011

15 0.007

16 0.005

17 0.006

18 0.006

19 0.004

20 0.003

POLK 2 GRID Q

-132-

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.006	0.005	0.004	0.004	0.004
-19	0.005	0.004	0.004	0.005	0.005
-18	0.004	0.004	0.005	0.006	0.007
-17	0.005	0.005	0.006	0.006	0.007
-16	0.007	0.006	0.007	0.006	0.008
-15	0.006	0.006	0.007	0.007	0.010
-14	0.006	0.006	0.007	0.009	0.012
-13	0.007	0.007	0.007	0.012	0.015
-12	0.008	0.009	0.009	0.016	0.018
-11	0.010	0.012	0.012	0.016	0.017
-10	0.015	0.015	0.019	0.021	0.015
-9	0.021	0.019	0.025	0.028	0.015
-8	0.021	0.020	0.025	0.024	0.016
-7	0.020	0.021	0.026	0.021	0.015
-6	0.022	0.026	0.031	0.020	0.012
-5	0.024	0.030	0.029	0.016	0.012
-4	0.025	0.029	0.026	0.016	0.014
-3	0.021	0.023	0.023	0.015	0.013
-2	0.022	0.023	0.020	0.014	0.016
-1	0.026	0.023	0.018	0.016	0.024
0	0.024	0.019	0.016	0.019	0.025
1	0.023	0.015	0.014	0.019	0.022
2	0.025	0.016	0.013	0.016	0.017
3	0.022	0.018	0.015	0.018	0.015
4	0.017	0.018	0.018	0.021	0.015
5	0.014	0.019	0.022	0.021	0.016
6	0.013	0.018	0.020	0.017	0.015
7	0.013	0.014	0.016	0.015	0.014
8	0.013	0.011	0.011	0.010	0.012
9	0.013	0.011	0.011	0.010	0.015
10	0.010	0.009	0.010	0.011	0.018
11	0.007	0.008	0.009	0.010	0.019
12	0.009	0.011	0.010	0.011	0.017
13	0.011	0.013	0.011	0.012	0.016
14	0.012	0.013	0.010	0.010	0.011
15	0.012	0.012	0.008	0.008	0.008
16	0.010	0.009	0.006	0.006	0.006
17	0.011	0.009	0.005	0.005	0.006
18	0.010	0.009	0.006	0.005	0.005
19	0.008	0.008	0.006	0.005	0.004
20	0.007	0.008	0.006	0.004	0.003

POLK 2 GRID Q

-133-

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.004
-19	0.005
-18	0.007
-17	0.007
-16	0.009
-15	0.011
-14	0.013
-13	0.013
-12	0.015
-11	0.014

-10	0.011
-9	0.010
-8	0.014
-7	0.018
-6	0.015
-5	0.014
-4	0.014
-3	0.013
-2	0.018
-1	0.026

0	0.026
1	0.019
2	0.014
3	0.012
4	0.012
5	0.015
6	0.018
7	0.018
8	0.016
9	0.020

10	0.024
11	0.024
12	0.019
13	0.016
14	0.011
15	0.007
16	0.005
17	0.006
18	0.006
19	0.004

20	0.003
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BENNING 1 GRID R

-134-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.009	0.008	0.009	0.009	0.006
-19	0.008	0.007	0.008	0.008	0.007
-18	0.008	0.008	0.008	0.007	0.007
-17	0.010	0.010	0.010	0.009	0.009
-16	0.011	0.010	0.010	0.010	0.010
-15	0.008	0.007	0.008	0.010	0.011
-14	0.006	0.007	0.008	0.008	0.008
-13	0.006	0.007	0.008	0.008	0.009
-12	0.005	0.006	0.007	0.008	0.010
-11	0.007	0.006	0.008	0.009	0.012
-10	0.008	0.006	0.007	0.007	0.009
-9	0.006	0.005	0.005	0.006	0.009
-8	0.007	0.007	0.007	0.007	0.008
-7	0.009	0.011	0.011	0.009	0.009
-6	0.012	0.016	0.017	0.012	0.010
-5	0.021	0.020	0.023	0.019	0.020
-4	0.051	0.028	0.036	0.024	0.027
-3	0.135	0.090	0.059	0.035	0.041
-2	0.337	0.561	0.119	0.093	0.027
-1	9.161	4.211	0.577	0.257	0.085
0		30.978	4.637	1.771	0.564
1	9.161	10.024	4.763	3.367	1.615
2	0.337	0.844	1.033	1.285	1.055
3	0.135	0.126	0.192	0.176	0.209
4	0.051	0.045	0.065	0.068	0.083
5	0.021	0.018	0.023	0.029	0.040
6	0.012	0.010	0.009	0.013	0.019
7	0.009	0.009	0.007	0.008	0.009
8	0.007	0.006	0.006	0.007	0.009
9	0.006	0.007	0.007	0.006	0.006
10	0.008	0.009	0.007	0.007	0.007
11	0.007	0.008	0.007	0.006	0.007
12	0.005	0.006	0.005	0.005	0.009
13	0.006	0.005	0.004	0.004	0.007
14	0.006	0.006	0.005	0.005	0.006
15	0.008	0.007	0.008	0.007	0.006
16	0.011	0.011	0.009	0.008	0.008
17	0.010	0.008	0.007	0.007	0.007
18	0.008	0.006	0.006	0.008	0.009
19	0.008	0.007	0.007	0.008	0.008
20	0.009	0.010	0.008	0.006	0.007

BENNING 1 GRID R

-135-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.005	0.004	0.006	0.009	0.008
-19	0.006	0.005	0.003	0.004	0.006
-18	0.005	0.005	0.006	0.009	0.007
-17	0.009	0.008	0.006	0.005	0.006
-16	0.009	0.011	0.013	0.016	0.013
-15	0.011	0.014	0.015	0.020	0.023
-14	0.009	0.012	0.015	0.018	0.019
-13	0.010	0.010	0.009	0.007	0.009
-12	0.009	0.008	0.009	0.010	0.009
-11	0.011	0.008	0.008	0.008	0.008
-10	0.009	0.008	0.009	0.012	0.009
-9	0.012	0.009	0.005	0.005	0.007
-8	0.008	0.009	0.011	0.012	0.010
-7	0.011	0.012	0.010	0.007	0.007
-6	0.012	0.014	0.014	0.013	0.009
-5	0.021	0.018	0.009	0.005	0.005
-4	0.022	0.024	0.019	0.016	0.010
-3	0.044	0.031	0.016	0.012	0.012
-2	0.030	0.020	0.027	0.021	0.016
-1	0.051	0.024	0.023	0.013	0.014
0	0.144	0.058	0.037	0.028	0.020
1	1.166	0.765	0.251	0.091	0.036
2	1.654	1.473	0.807	0.579	0.250
3	0.497	0.591	0.627	0.718	0.426
4	0.070	0.055	0.112	0.188	0.187
5	0.039	0.035	0.031	0.029	0.035
6	0.024	0.027	0.024	0.019	0.016
7	0.008	0.012	0.018	0.019	0.015
8	0.009	0.010	0.008	0.006	0.010
9	0.008	0.011	0.011	0.012	0.010
10	0.011	0.010	0.006	0.005	0.007
11	0.008	0.008	0.010	0.011	0.009
12	0.010	0.008	0.006	0.004	0.005
13	0.007	0.008	0.009	0.009	0.007
14	0.007	0.007	0.005	0.005	0.007
15	0.006	0.007	0.010	0.011	0.009
16	0.008	0.010	0.009	0.007	0.007
17	0.008	0.010	0.013	0.012	0.008
18	0.011	0.011	0.008	0.006	0.008
19	0.007	0.007	0.008	0.009	0.009
20	0.007	0.006	0.004	0.005	0.010

BENNING 1 GRID R

-136-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.008	0.006	0.006	0.008	0.008
-19	0.007	0.006	0.006	0.007	0.008
-18	0.005	0.005	0.006	0.006	0.006
-17	0.009	0.009	0.007	0.005	0.004
-16	0.008	0.006	0.006	0.005	0.006
-15	0.015	0.008	0.007	0.007	0.007
-14	0.014	0.008	0.008	0.007	0.006
-13	0.011	0.011	0.009	0.007	0.006
-12	0.009	0.009	0.009	0.008	0.007
-11	0.010	0.010	0.008	0.007	0.009
-10	0.006	0.007	0.008	0.009	0.011
-9	0.009	0.008	0.009	0.010	0.011
-8	0.006	0.005	0.007	0.009	0.008
-7	0.007	0.008	0.007	0.007	0.007
-6	0.006	0.007	0.007	0.007	0.006
-5	0.009	0.010	0.008	0.006	0.005
-4	0.008	0.008	0.009	0.007	0.006
-3	0.012	0.011	0.011	0.009	0.008
-2	0.009	0.010	0.011	0.012	0.011
-1	0.013	0.014	0.013	0.014	0.013
0	0.019	0.017	0.019	0.020	0.017
1	0.024	0.017	0.019	0.018	0.019
2	0.085	0.044	0.023	0.014	0.014
3	0.266	0.177	0.077	0.043	0.023
4	0.222	0.191	0.130	0.102	0.058
5	0.055	0.065	0.076	0.078	0.060
6	0.020	0.025	0.032	0.035	0.035
7	0.012	0.013	0.018	0.019	0.019
8	0.013	0.011	0.012	0.012	0.010
9	0.008	0.007	0.008	0.010	0.008
10	0.010	0.010	0.010	0.008	0.006
11	0.005	0.005	0.010	0.009	0.007
12	0.007	0.007	0.005	0.005	0.006
13	0.005	0.004	0.003	0.004	0.005
14	0.010	0.009	0.006	0.005	0.006
15	0.008	0.007	0.006	0.007	0.007
16	0.007	0.006	0.005	0.006	0.008
17	0.004	0.003	0.004	0.005	0.006
18	0.006	0.005	0.005	0.004	0.005
19	0.006	0.005	0.005	0.005	0.006
20	0.010	0.007	0.006	0.007	0.007

BENNING 1 GRID R

-137-

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.007	0.008	0.008	0.006	0.005
-19	0.008	0.009	0.008	0.006	0.005
-18	0.007	0.008	0.006	0.005	0.004
-17	0.006	0.006	0.006	0.006	0.005
-16	0.006	0.006	0.006	0.006	0.005
-15	0.006	0.006	0.006	0.004	0.004
-14	0.007	0.006	0.005	0.004	0.004
-13	0.007	0.007	0.006	0.005	0.005
-12	0.010	0.009	0.009	0.008	0.007
-11	0.013	0.013	0.013	0.013	0.014
-10	0.013	0.012	0.013	0.016	0.018
-9	0.012	0.011	0.012	0.014	0.014
-8	0.010	0.011	0.011	0.012	0.012
-7	0.008	0.009	0.010	0.010	0.012
-6	0.007	0.008	0.008	0.009	0.009
-5	0.005	0.007	0.007	0.007	0.006
-4	0.005	0.007	0.007	0.007	0.005
-3	0.006	0.006	0.006	0.007	0.005
-2	0.011	0.008	0.011	0.007	0.007
-1	0.014	0.015	0.018	0.013	0.011
0	0.016	0.016	0.015	0.014	0.013
1	0.018	0.018	0.012	0.012	0.008
2	0.015	0.017	0.009	0.009	0.005
3	0.017	0.010	0.009	0.007	0.009
4	0.039	0.024	0.017	0.009	0.010
5	0.054	0.046	0.031	0.017	0.014
6	0.037	0.041	0.033	0.025	0.026
7	0.020	0.028	0.024	0.018	0.022
8	0.010	0.016	0.015	0.010	0.012
9	0.006	0.006	0.007	0.009	0.013
10	0.005	0.004	0.005	0.007	0.009
11	0.006	0.004	0.004	0.005	0.008
12	0.006	0.005	0.005	0.006	0.006
13	0.006	0.006	0.007	0.006	0.006
14	0.006	0.006	0.006	0.006	0.005
15	0.006	0.005	0.006	0.005	0.005
16	0.007	0.006	0.006	0.005	0.005
17	0.006	0.005	0.005	0.006	0.006
18	0.005	0.006	0.005	0.006	0.006
19	0.007	0.006	0.005	0.005	0.005
20	0.008	0.006	0.004	0.005	0.004

BENNING 1 GRID R

-138-

CORRECTED SPECTRUM. (E-STAR)

20

-20	0.005
-19	0.005
-18	0.004
-17	0.004
-16	0.005
-15	0.005
-14	0.004
-13	0.004
-12	0.007
-11	0.012

-10	0.016
-9	0.015
-8	0.015
-7	0.015
-6	0.010
-5	0.006
-4	0.008
-3	0.008
-2	0.004
-1	0.008

0	0.015
1	0.011
2	0.008
3	0.009
4	0.010
5	0.013
6	0.027
7	0.026
8	0.014
9	0.013

10	0.010
11	0.009
12	0.006
13	0.005
14	0.004
15	0.004
16	0.005
17	0.005
18	0.006
19	0.005

20	0.004
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BENNING 2 GRID 5

-139-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.015	0.015	0.013	0.011	0.011
-19	0.013	0.013	0.011	0.010	0.011
-18	0.013	0.015	0.016	0.015	0.013
-17	0.017	0.020	0.024	0.023	0.019
-16	0.023	0.027	0.026	0.024	0.023
-15	0.029	0.030	0.025	0.022	0.023
-14	0.026	0.030	0.028	0.024	0.021
-13	0.031	0.036	0.033	0.027	0.020
-12	0.035	0.035	0.037	0.038	0.030
-11	0.033	0.036	0.043	0.046	0.041
-10	0.037	0.045	0.052	0.051	0.052
-9	0.041	0.049	0.050	0.053	0.059
-8	0.054	0.052	0.046	0.051	0.056
-7	0.071	0.059	0.055	0.057	0.055
-6	0.111	0.092	0.082	0.071	0.069
-5	0.189	0.156	0.131	0.108	0.104
-4	0.419	0.317	0.259	0.201	0.148
-3	1.297	0.867	0.547	0.369	0.235
-2	5.172	3.075	1.367	0.661	0.327
-1	66.068	17.541	3.122	0.882	0.384
0		72.457	5.157	1.117	0.490
1	66.068	22.291	4.882	1.367	0.609
2	5.172	4.569	2.774	1.296	0.550
3	1.297	1.333	1.124	0.896	0.473
4	0.419	0.482	0.466	0.463	0.346
5	0.199	0.229	0.265	0.257	0.220
6	0.111	0.127	0.147	0.148	0.140
7	0.071	0.076	0.083	0.098	0.099
8	0.054	0.050	0.053	0.065	0.062
9	0.041	0.038	0.041	0.040	0.038
10	0.037	0.035	0.033	0.030	0.038
11	0.033	0.029	0.025	0.029	0.033
12	0.035	0.028	0.026	0.030	0.028
13	0.031	0.024	0.024	0.027	0.023
14	0.026	0.021	0.023	0.025	0.020
15	0.029	0.022	0.021	0.023	0.019
16	0.023	0.015	0.013	0.017	0.017
17	0.017	0.011	0.011	0.015	0.016
18	0.013	0.009	0.010	0.017	0.019
19	0.013	0.011	0.011	0.015	0.016
20	0.015	0.014	0.014	0.014	0.013

BENNING 2 GRID 5

-140-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.012	0.012	0.014	0.016	0.017
-19	0.011	0.012	0.015	0.017	0.016
-18	0.011	0.011	0.014	0.018	0.015
-17	0.013	0.011	0.014	0.016	0.014
-16	0.017	0.013	0.016	0.018	0.019
-15	0.020	0.016	0.017	0.019	0.021
-14	0.017	0.017	0.024	0.024	0.022
-13	0.018	0.021	0.032	0.034	0.026
-12	0.028	0.026	0.032	0.043	0.034
-11	0.035	0.026	0.028	0.039	0.041
-10	0.038	0.025	0.034	0.044	0.047
-9	0.044	0.035	0.040	0.043	0.046
-8	0.050	0.047	0.043	0.043	0.050
-7	0.050	0.045	0.048	0.059	0.067
-6	0.066	0.055	0.054	0.070	0.078
-5	0.090	0.077	0.061	0.066	0.073
-4	0.114	0.095	0.071	0.078	0.103
-3	0.143	0.114	0.104	0.111	0.124
-2	0.179	0.163	0.156	0.128	0.103
-1	0.253	0.230	0.181	0.117	0.106
0	0.305	0.199	0.150	0.142	0.150
1	0.319	0.169	0.149	0.161	0.160
2	0.268	0.170	0.158	0.152	0.141
3	0.219	0.125	0.114	0.137	0.156
4	0.221	0.124	0.085	0.091	0.112
5	0.188	0.139	0.080	0.061	0.067
6	0.124	0.105	0.074	0.058	0.062
7	0.073	0.057	0.059	0.067	0.068
8	0.052	0.042	0.044	0.056	0.052
9	0.042	0.041	0.038	0.045	0.039
10	0.040	0.034	0.032	0.038	0.041
11	0.028	0.025	0.027	0.030	0.034
12	0.023	0.021	0.026	0.028	0.026
13	0.019	0.020	0.027	0.028	0.023
14	0.016	0.018	0.022	0.021	0.019
15	0.015	0.016	0.018	0.016	0.016
16	0.016	0.018	0.018	0.013	0.014
17	0.015	0.018	0.017	0.013	0.014
18	0.016	0.016	0.016	0.014	0.014
19	0.015	0.012	0.012	0.011	0.013
20	0.012	0.010	0.009	0.009	0.010

BENNING 2 GRID 5

-141-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.013	0.008	0.009	0.009	0.012
-19	0.011	0.010	0.010	0.009	0.011
-18	0.010	0.010	0.011	0.012	0.010
-17	0.014	0.015	0.015	0.017	0.012
-16	0.018	0.015	0.015	0.016	0.015
-15	0.020	0.019	0.016	0.013	0.017
-14	0.018	0.017	0.016	0.016	0.020
-13	0.024	0.028	0.027	0.022	0.022
-12	0.031	0.031	0.028	0.024	0.020
-11	0.036	0.033	0.025	0.022	0.020
-10	0.038	0.026	0.023	0.024	0.020
-9	0.038	0.034	0.038	0.034	0.025
-8	0.045	0.036	0.039	0.033	0.029
-7	0.058	0.038	0.031	0.026	0.025
-6	0.058	0.035	0.031	0.029	0.032
-5	0.065	0.059	0.048	0.042	0.042
-4	0.107	0.098	0.066	0.058	0.062
-3	0.125	0.109	0.068	0.070	0.078
-2	0.096	0.093	0.076	0.084	0.084
-1	0.103	0.103	0.102	0.090	0.088
0	0.117	0.110	0.110	0.092	0.095
1	0.117	0.107	0.109	0.099	0.095
2	0.127	0.135	0.116	0.099	0.090
3	0.232	0.320	0.205	0.096	0.096
4	0.207	0.329	0.234	0.111	0.092
5	0.083	0.122	0.103	0.064	0.062
6	0.057	0.062	0.046	0.026	0.029
7	0.051	0.044	0.033	0.021	0.022
8	0.043	0.043	0.038	0.028	0.029
9	0.033	0.033	0.033	0.025	0.023
10	0.041	0.040	0.030	0.016	0.015
11	0.036	0.037	0.030	0.016	0.016
12	0.027	0.027	0.024	0.017	0.015
13	0.018	0.014	0.014	0.017	0.019
14	0.023	0.023	0.017	0.016	0.017
15	0.019	0.017	0.014	0.013	0.016
16	0.013	0.014	0.015	0.014	0.014
17	0.012	0.011	0.014	0.014	0.013
18	0.017	0.021	0.019	0.012	0.011
19	0.015	0.018	0.019	0.019	0.018
20	0.012	0.016	0.021	0.025	0.022

BENNING 2 GRID S

-142-

CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.014	0.011	0.009	0.008	0.010
-19	0.013	0.012	0.010	0.010	0.013
-18	0.011	0.013	0.013	0.015	0.016
-17	0.010	0.014	0.016	0.017	0.017
-16	0.012	0.012	0.012	0.014	0.015
-15	0.015	0.011	0.010	0.011	0.013
-14	0.017	0.011	0.013	0.016	0.016
-13	0.018	0.012	0.013	0.019	0.017
-12	0.016	0.013	0.012	0.014	0.011
-11	0.019	0.016	0.013	0.012	0.010
-10	0.017	0.016	0.016	0.014	0.011
-9	0.021	0.020	0.020	0.017	0.014
-8	0.029	0.026	0.025	0.021	0.017
-7	0.025	0.025	0.024	0.023	0.023
-6	0.030	0.031	0.033	0.035	0.034
-5	0.039	0.037	0.046	0.052	0.048
-4	0.053	0.042	0.049	0.054	0.061
-3	0.081	0.085	0.070	0.072	0.111
-2	0.109	0.138	0.118	0.113	0.145
-1	0.114	0.135	0.120	0.114	0.118
0	0.104	0.109	0.111	0.110	0.098
1	0.080	0.091	0.110	0.098	0.085
2	0.080	0.093	0.095	0.073	0.072
3	0.083	0.070	0.063	0.049	0.053
4	0.071	0.051	0.048	0.046	0.051
5	0.065	0.057	0.046	0.040	0.046
6	0.044	0.052	0.042	0.031	0.030
7	0.028	0.033	0.037	0.033	0.023
8	0.027	0.023	0.026	0.027	0.020
9	0.023	0.023	0.022	0.019	0.014
10	0.022	0.026	0.019	0.014	0.013
11	0.020	0.019	0.015	0.013	0.012
12	0.015	0.014	0.015	0.015	0.013
13	0.017	0.017	0.018	0.018	0.016
14	0.019	0.019	0.017	0.018	0.016
15	0.021	0.018	0.015	0.018	0.017
16	0.018	0.018	0.014	0.018	0.017
17	0.013	0.016	0.014	0.014	0.012
18	0.012	0.017	0.018	0.016	0.013
19	0.017	0.018	0.019	0.020	0.026
20	0.019	0.016	0.016	0.020	0.022

BENNING 2 GRID S

-143-

CORRECTED SPECTRUM, (F-STAR)

20

-20	0.014
-19	0.016
-18	0.016
-17	0.014
-16	0.014
-15	0.013
-14	0.014
-13	0.015
-12	0.010
-11	0.010

-10	0.012
-9	0.013
-8	0.015
-7	0.024
-6	0.034
-5	0.046
-4	0.068
-3	0.138
-2	0.172
-1	0.137

0	0.124
1	0.094
2	0.065
3	0.052
4	0.056
5	0.050
6	0.032
7	0.020
8	0.017
9	0.013

10	0.012
11	0.012
12	0.011
13	0.014
14	0.016
15	0.016
16	0.014
17	0.011
18	0.011
19	0.017

20	0.019
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MCCLELLAN 1 GRID T

-144-

CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.012	0.008	0.009	0.011	0.015
-19	0.012	0.010	0.010	0.010	0.012
-18	0.010	0.009	0.008	0.008	0.007
-17	0.009	0.011	0.010	0.008	0.007
-16	0.011	0.015	0.013	0.009	0.008
-15	0.015	0.018	0.015	0.010	0.010
-14	0.015	0.018	0.015	0.012	0.012
-13	0.012	0.015	0.016	0.015	0.014
-12	0.014	0.017	0.018	0.014	0.014
-11	0.022	0.022	0.016	0.015	0.019
-10	0.025	0.024	0.017	0.019	0.026
-9	0.025	0.020	0.020	0.026	0.034
-8	0.025	0.017	0.020	0.030	0.037
-7	0.034	0.025	0.025	0.034	0.032
-6	0.053	0.047	0.043	0.049	0.040
-5	0.076	0.073	0.061	0.052	0.045
-4	0.099	0.121	0.093	0.058	0.042
-3	0.173	0.178	0.120	0.071	0.045
-2	0.567	0.317	0.148	0.074	0.062
-1	6.898	1.591	0.302	0.099	0.064
0		8.736	0.730	0.142	0.056
1	6.898	4.276	1.149	0.332	0.129
2	0.567	1.031	0.905	0.483	0.207
3	0.173	0.304	0.367	0.267	0.156
4	0.099	0.131	0.130	0.106	0.102
5	0.076	0.075	0.057	0.052	0.066
6	0.053	0.043	0.037	0.042	0.042
7	0.034	0.035	0.032	0.043	0.039
8	0.025	0.029	0.027	0.032	0.033
9	0.025	0.021	0.020	0.024	0.027
10	0.025	0.018	0.016	0.017	0.022
11	0.022	0.017	0.017	0.016	0.018
12	0.014	0.012	0.014	0.013	0.014
13	0.012	0.010	0.011	0.010	0.012
14	0.015	0.011	0.011	0.013	0.017
15	0.015	0.011	0.014	0.016	0.017
16	0.011	0.009	0.013	0.014	0.016
17	0.009	0.008	0.008	0.010	0.012
18	0.010	0.011	0.007	0.008	0.010
19	0.012	0.011	0.009	0.010	0.011
20	0.012	0.013	0.010	0.011	0.012

MCCLELLAN 1 GRID T

-145-

CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.016	0.015	0.013	0.014	0.016
-19	0.013	0.013	0.013	0.014	0.015
-18	0.010	0.011	0.010	0.011	0.014
-17	0.012	0.014	0.008	0.008	0.014
-16	0.010	0.011	0.010	0.013	0.015
-15	0.010	0.011	0.014	0.019	0.017
-14	0.012	0.014	0.015	0.016	0.014
-13	0.015	0.015	0.012	0.010	0.009
-12	0.018	0.017	0.012	0.010	0.010
-11	0.017	0.018	0.015	0.012	0.012
-10	0.020	0.019	0.019	0.013	0.013
-9	0.026	0.019	0.018	0.014	0.016
-8	0.026	0.018	0.018	0.018	0.020
-7	0.022	0.021	0.019	0.022	0.023
-6	0.032	0.031	0.024	0.026	0.024
-5	0.041	0.037	0.030	0.025	0.023
-4	0.039	0.040	0.035	0.030	0.030
-3	0.036	0.035	0.036	0.037	0.036
-2	0.047	0.036	0.040	0.038	0.036
-1	0.050	0.047	0.051	0.039	0.034
0	0.050	0.045	0.051	0.046	0.034
1	0.060	0.039	0.039	0.041	0.030
2	0.081	0.040	0.032	0.029	0.028
3	0.084	0.039	0.032	0.037	0.041
4	0.072	0.042	0.056	0.074	0.066
5	0.068	0.053	0.061	0.077	0.082
6	0.047	0.042	0.034	0.039	0.048
7	0.031	0.033	0.028	0.027	0.027
8	0.031	0.046	0.043	0.029	0.025
9	0.028	0.043	0.043	0.023	0.021
10	0.025	0.034	0.037	0.022	0.016
11	0.024	0.036	0.039	0.026	0.017
12	0.021	0.032	0.029	0.022	0.023
13	0.016	0.021	0.017	0.019	0.021
14	0.015	0.016	0.014	0.013	0.016
15	0.015	0.014	0.013	0.011	0.012
16	0.017	0.015	0.013	0.011	0.012
17	0.015	0.013	0.012	0.011	0.012
18	0.010	0.009	0.012	0.013	0.011
19	0.009	0.009	0.013	0.013	0.010
20	0.010	0.011	0.013	0.010	0.009

MCCLELLAN 1 GRID T

-146-

CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.017	0.017	0.013	0.014	0.020
-19	0.016	0.019	0.014	0.013	0.017
-18	0.014	0.019	0.017	0.013	0.014
-17	0.014	0.015	0.016	0.012	0.014
-16	0.012	0.010	0.012	0.013	0.013
-15	0.012	0.010	0.014	0.016	0.013
-14	0.012	0.012	0.013	0.013	0.012
-13	0.010	0.012	0.011	0.009	0.011
-12	0.008	0.008	0.009	0.010	0.014
-11	0.008	0.009	0.012	0.014	0.015
-10	0.011	0.010	0.014	0.016	0.015
-9	0.018	0.015	0.016	0.016	0.013
-8	0.023	0.017	0.014	0.015	0.016
-7	0.022	0.016	0.014	0.015	0.021
-6	0.017	0.015	0.015	0.018	0.024
-5	0.018	0.018	0.017	0.017	0.020
-4	0.021	0.017	0.018	0.020	0.021
-3	0.024	0.021	0.026	0.028	0.028
-2	0.030	0.028	0.035	0.035	0.031
-1	0.032	0.028	0.030	0.037	0.033
0	0.029	0.029	0.028	0.033	0.033
1	0.027	0.030	0.033	0.036	0.033
2	0.027	0.028	0.033	0.039	0.035
3	0.035	0.027	0.027	0.035	0.036
4	0.050	0.032	0.025	0.031	0.028
5	0.065	0.034	0.021	0.023	0.018
6	0.042	0.026	0.018	0.015	0.014
7	0.021	0.020	0.017	0.014	0.017
8	0.018	0.019	0.017	0.015	0.016
9	0.018	0.015	0.015	0.015	0.014
10	0.015	0.013	0.015	0.017	0.016
11	0.014	0.014	0.016	0.020	0.017
12	0.018	0.016	0.016	0.019	0.016
13	0.017	0.017	0.014	0.016	0.017
14	0.017	0.017	0.015	0.017	0.018
15	0.012	0.014	0.019	0.022	0.017
16	0.010	0.011	0.019	0.025	0.020
17	0.014	0.016	0.018	0.029	0.026
18	0.015	0.019	0.022	0.028	0.022
19	0.012	0.014	0.019	0.022	0.018
20	0.011	0.012	0.015	0.018	0.018

MCCLELLAN 1 GRID T

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CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.024	0.023	0.020	0.015	0.013
-19	0.018	0.019	0.018	0.014	0.013
-18	0.013	0.013	0.012	0.011	0.012
-17	0.016	0.014	0.013	0.008	0.009
-16	0.015	0.014	0.010	0.009	0.011
-15	0.013	0.014	0.011	0.011	0.014
-14	0.016	0.020	0.015	0.012	0.012
-13	0.014	0.019	0.016	0.012	0.012
-12	0.014	0.013	0.013	0.013	0.015
-11	0.014	0.013	0.012	0.013	0.013
-10	0.016	0.016	0.011	0.010	0.011
-9	0.017	0.018	0.013	0.010	0.011
-8	0.020	0.019	0.014	0.016	0.018
-7	0.024	0.017	0.015	0.024	0.021
-6	0.025	0.016	0.017	0.026	0.020
-5	0.020	0.019	0.019	0.022	0.021
-4	0.018	0.023	0.025	0.020	0.021
-3	0.023	0.023	0.026	0.024	0.021
-2	0.029	0.024	0.024	0.025	0.024
-1	0.026	0.025	0.026	0.029	0.034
0	0.026	0.025	0.028	0.032	0.039
1	0.027	0.026	0.030	0.031	0.031
2	0.023	0.018	0.022	0.023	0.024
3	0.022	0.015	0.017	0.021	0.026
4	0.019	0.016	0.018	0.021	0.025
5	0.016	0.017	0.017	0.018	0.018
6	0.015	0.015	0.015	0.016	0.014
7	0.017	0.015	0.013	0.014	0.015
8	0.017	0.015	0.012	0.011	0.014
9	0.018	0.021	0.020	0.017	0.017
10	0.017	0.020	0.023	0.022	0.019
11	0.016	0.016	0.018	0.019	0.015
12	0.016	0.020	0.017	0.012	0.011
13	0.018	0.021	0.014	0.010	0.012
14	0.019	0.017	0.014	0.013	0.014
15	0.014	0.011	0.011	0.015	0.016
16	0.016	0.012	0.011	0.016	0.017
17	0.019	0.014	0.012	0.016	0.015
18	0.019	0.016	0.013	0.013	0.013
19	0.019	0.016	0.012	0.012	0.012
20	0.021	0.016	0.012	0.013	0.013

MCCLELLAN 1 GRID T

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CORRECTED SPECTRUM, (F-STAR)

20

-20	0.014
-19	0.015
-18	0.015
-17	0.011
-16	0.011
-15	0.013
-14	0.012
-13	0.013
-12	0.016
-11	0.014
-10	0.013
-9	0.013
-8	0.017
-7	0.016
-6	0.014
-5	0.018
-4	0.020
-3	0.019
-2	0.023
-1	0.037
0	0.046
1	0.031
2	0.021
3	0.025
4	0.027
5	0.018
6	0.013
7	0.016
8	0.016
9	0.017
10	0.017
11	0.013
12	0.011
13	0.013
14	0.014
15	0.016
16	0.016
17	0.015
18	0.016
19	0.013
20	0.012

MCCLELLAN 2 GRID DEF. U

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CORRECTED SPECTRUM, (F-STAR)

	0	1	2	3	4
-20	0.009	0.012	0.013	0.014	0.018
-19	0.012	0.013	0.012	0.013	0.020
-18	0.016	0.015	0.011	0.013	0.020
-17	0.016	0.013	0.011	0.014	0.018
-16	0.014	0.015	0.018	0.019	0.020
-15	0.016	0.022	0.026	0.022	0.023
-14	0.018	0.029	0.032	0.023	0.022
-13	0.021	0.028	0.032	0.026	0.019
-12	0.027	0.025	0.031	0.030	0.021
-11	0.028	0.025	0.028	0.028	0.024
-10	0.024	0.028	0.031	0.028	0.028
-9	0.037	0.036	0.042	0.035	0.028
-8	0.070	0.060	0.058	0.050	0.039
-7	0.117	0.108	0.083	0.064	0.066
-6	0.192	0.196	0.161	0.103	0.117
-5	0.411	0.402	0.341	0.216	0.198
-4	1.217	1.131	0.819	0.532	0.364
-3	4.538	3.872	2.337	1.396	0.791
-2	27.196	17.630	7.970	3.583	1.829
-1	462.179	123.871	22.637	7.272	3.100
0		503.115	33.882	8.260	3.037
1	462.179	126.645	21.546	5.679	2.263
2	27.196	19.853	7.934	3.116	1.541
3	4.538	3.829	2.565	1.439	0.835
4	1.217	1.206	0.937	0.626	0.420
5	0.411	0.436	0.339	0.264	0.185
6	0.192	0.180	0.184	0.175	0.121
7	0.117	0.123	0.140	0.128	0.089
8	0.070	0.082	0.093	0.080	0.073
9	0.037	0.045	0.052	0.055	0.081
10	0.024	0.033	0.038	0.042	0.064
11	0.028	0.035	0.036	0.034	0.036
12	0.027	0.027	0.027	0.030	0.026
13	0.021	0.021	0.024	0.028	0.028
14	0.018	0.018	0.019	0.023	0.025
15	0.016	0.015	0.015	0.020	0.019
16	0.014	0.016	0.015	0.020	0.020
17	0.016	0.016	0.014	0.018	0.019
18	0.016	0.013	0.010	0.015	0.015
19	0.012	0.011	0.013	0.013	0.013
20	0.009	0.011	0.015	0.014	0.016

MCCLELLAN 2 GRID DEF. U

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CORRECTED SPECTRUM, (F-STAR)

	5	6	7	8	9
-20	0.017	0.010	0.007	0.010	0.012
-19	0.017	0.009	0.008	0.012	0.012
-18	0.018	0.010	0.009	0.010	0.013
-17	0.016	0.010	0.009	0.010	0.013
-16	0.015	0.014	0.016	0.015	0.017
-15	0.018	0.016	0.019	0.021	0.018
-14	0.018	0.015	0.015	0.019	0.018
-13	0.017	0.016	0.017	0.021	0.023
-12	0.020	0.020	0.018	0.020	0.024
-11	0.026	0.026	0.020	0.018	0.020
-10	0.032	0.030	0.023	0.022	0.022
-9	0.030	0.029	0.027	0.029	0.029
-8	0.035	0.030	0.030	0.035	0.039
-7	0.071	0.055	0.051	0.050	0.045
-6	0.124	0.111	0.092	0.056	0.049
-5	0.165	0.157	0.140	0.088	0.068
-4	0.261	0.233	0.190	0.150	0.118
-3	0.461	0.329	0.261	0.231	0.164
-2	0.907	0.452	0.373	0.348	0.249
-1	1.239	0.593	0.433	0.414	0.355
0	1.156	0.620	0.460	0.450	0.406
1	1.068	0.625	0.428	0.337	0.279
2	0.854	0.604	0.373	0.245	0.179
3	0.503	0.448	0.334	0.212	0.157
4	0.283	0.244	0.199	0.152	0.130
5	0.142	0.132	0.103	0.080	0.083
6	0.079	0.085	0.079	0.055	0.052
7	0.069	0.068	0.049	0.036	0.040
8	0.080	0.067	0.035	0.027	0.033
9	0.091	0.070	0.039	0.024	0.034
10	0.070	0.058	0.041	0.024	0.028
11	0.038	0.044	0.038	0.022	0.023
12	0.024	0.031	0.027	0.018	0.021
13	0.026	0.021	0.013	0.014	0.021
14	0.023	0.017	0.011	0.017	0.024
15	0.017	0.019	0.016	0.020	0.025
16	0.016	0.019	0.020	0.019	0.017
17	0.013	0.013	0.014	0.012	0.010
18	0.011	0.011	0.013	0.012	0.008
19	0.014	0.014	0.013	0.012	0.010
20	0.018	0.016	0.014	0.013	0.014

MCCLELLAN 2 GRID DEF. U

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CORRECTED SPECTRUM, (F-STAR)

	10	11	12	13	14
-20	0.013	0.012	0.011	0.010	0.010
-19	0.013	0.010	0.009	0.010	0.009
-18	0.017	0.013	0.013	0.015	0.014
-17	0.017	0.013	0.009	0.012	0.012
-16	0.017	0.013	0.014	0.016	0.016
-15	0.014	0.013	0.016	0.019	0.018
-14	0.016	0.017	0.023	0.024	0.024
-13	0.020	0.019	0.019	0.019	0.017
-12	0.026	0.028	0.029	0.024	0.019
-11	0.021	0.020	0.018	0.018	0.014
-10	0.022	0.020	0.019	0.016	0.017
-9	0.030	0.028	0.027	0.027	0.022
-8	0.041	0.037	0.041	0.048	0.039
-7	0.042	0.043	0.035	0.029	0.036
-6	0.052	0.067	0.053	0.030	0.050
-5	0.084	0.087	0.061	0.051	0.057
-4	0.139	0.148	0.124	0.112	0.112
-3	0.147	0.160	0.143	0.143	0.165
-2	0.221	0.208	0.205	0.204	0.205
-1	0.312	0.318	0.359	0.367	0.325
0	0.361	0.421	0.490	0.455	0.449
1	0.329	0.410	0.388	0.335	0.403
2	0.222	0.287	0.203	0.176	0.263
3	0.151	0.156	0.117	0.106	0.152
4	0.117	0.102	0.090	0.090	0.083
5	0.075	0.073	0.093	0.084	0.070
6	0.040	0.034	0.048	0.052	0.041
7	0.038	0.027	0.036	0.043	0.030
8	0.033	0.024	0.027	0.029	0.019
9	0.031	0.022	0.027	0.029	0.025
10	0.027	0.024	0.029	0.028	0.021
11	0.027	0.027	0.031	0.025	0.022
12	0.022	0.019	0.019	0.018	0.016
13	0.019	0.017	0.022	0.022	0.018
14	0.018	0.012	0.012	0.015	0.013
15	0.020	0.013	0.013	0.014	0.016
16	0.016	0.012	0.007	0.009	0.012
17	0.014	0.014	0.010	0.009	0.012
18	0.009	0.011	0.010	0.008	0.008
19	0.010	0.013	0.014	0.011	0.013
20	0.013	0.013	0.011	0.008	0.011

MCCLELLAN 2 GRID DEF. U

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CORRECTED SPECTRUM, (F-STAR)

	15	16	17	18	19
-20	0.017	0.017	0.011	0.010	0.011
-19	0.014	0.015	0.010	0.009	0.010
-18	0.019	0.017	0.010	0.009	0.010
-17	0.015	0.016	0.011	0.010	0.011
-16	0.014	0.013	0.014	0.012	0.012
-15	0.015	0.014	0.013	0.013	0.012
-14	0.019	0.014	0.012	0.012	0.011
-13	0.014	0.015	0.015	0.012	0.012
-12	0.017	0.016	0.014	0.012	0.012
-11	0.013	0.015	0.012	0.013	0.014
-10	0.018	0.019	0.016	0.016	0.018
-9	0.018	0.024	0.021	0.018	0.019
-8	0.028	0.022	0.021	0.021	0.025
-7	0.040	0.031	0.024	0.031	0.037
-6	0.060	0.043	0.032	0.038	0.039
-5	0.057	0.041	0.041	0.049	0.049
-4	0.087	0.057	0.065	0.077	0.074
-3	0.145	0.116	0.118	0.131	0.130
-2	0.235	0.228	0.176	0.165	0.173
-1	0.397	0.423	0.270	0.195	0.190
0	0.535	0.502	0.343	0.258	0.233
1	0.458	0.396	0.319	0.273	0.242
2	0.273	0.241	0.220	0.197	0.171
3	0.155	0.137	0.137	0.136	0.114
4	0.080	0.078	0.074	0.088	0.083
5	0.069	0.067	0.059	0.064	0.060
6	0.042	0.048	0.048	0.053	0.044
7	0.031	0.036	0.032	0.034	0.034
8	0.018	0.022	0.021	0.022	0.023
9	0.020	0.017	0.016	0.017	0.017
10	0.017	0.018	0.025	0.026	0.020
11	0.021	0.018	0.023	0.025	0.022
12	0.016	0.018	0.018	0.019	0.023
13	0.019	0.020	0.021	0.018	0.019
14	0.013	0.016	0.018	0.016	0.013
15	0.015	0.015	0.018	0.018	0.014
16	0.012	0.015	0.017	0.017	0.015
17	0.014	0.014	0.016	0.014	0.014
18	0.010	0.014	0.014	0.012	0.013
19	0.015	0.013	0.013	0.012	0.012
20	0.014	0.012	0.011	0.011	0.011

MCCLELLAN 2 GRID DEF. U

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CORRECTED SPECTRUM, (F-STAR)

20

-20	0.010
-19	0.011
-18	0.011
-17	0.012
-16	0.013
-15	0.011
-14	0.010
-13	0.010
-12	0.010
-11	0.012

-10	0.016
-9	0.019
-8	0.025
-7	0.034
-6	0.034
-5	0.049
-4	0.074
-3	0.125
-2	0.185
-1	0.203

0	0.224
1	0.243
2	0.170
3	0.100
4	0.071
5	0.047
6	0.036
7	0.029
8	0.019
9	0.015

10	0.018
11	0.021
12	0.022
13	0.018
14	0.013
15	0.013
16	0.016
17	0.016
18	0.015
19	0.012

20	0.010
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ABERDEEN 1

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS -2 TO -0

	-2	-1	0
-20	0.0278198	0.0274538	0.0342357
-19	0.0315925	0.0298364	0.0340821
-18	0.0358539	0.0282403	0.0404742
-17	0.0342975	0.0429933	0.0495046
-16	0.0240074	0.0396936	0.0519682
-15	0.0264078	0.0349720	0.0387617
-14	0.0327582	0.0360552	0.0324402
-13	0.0450519	0.0565207	0.0472906
-12	0.0488183	0.0580606	0.0526357
-11	0.0710358	0.0636440	0.0566222
-10	0.0983588	0.0835941	0.0789193
-9	0.1103469	0.1460026	0.1739589
-8	0.1714545	0.2349432	0.3067419
-7	0.3459855	0.4651871	0.4870527
-6	0.6489867	1.0978140	1.1499376
-5	1.3972340	2.5610043	2.8454378
-4	3.5982272	9.5555704	15.1048503
-3	10.3524969	38.8668232	79.7536631
-2	23.7091520	101.9967728	274.2427216
-1	32.0631456	176.9115849	1106.2592621
0	45.1102943	387.1688156	
1	47.6787000	358.7478828	1106.2592621
2	25.3786037	146.6065769	274.2427216
3	11.5172086	47.9258504	79.7536640
4	3.5826627	10.2196643	15.1048503
5	1.2911191	2.0103017	2.8454377
6	0.8727438	0.9095381	1.1499376
7	0.3929996	0.4200314	0.4870527
8	0.1618061	0.2523428	0.3067419
9	0.0951332	0.1299738	0.1739589
10	0.0771728	0.0820144	0.0789193
11	0.0720254	0.0627293	0.0566222
12	0.0782136	0.0573801	0.0526357
13	0.0791790	0.0462656	0.0472906
14	0.0522328	0.0358688	0.0324402
15	0.0323839	0.0345428	0.0387617
16	0.0382133	0.0446882	0.0519683
17	0.0410682	0.0426793	0.0495047
18	0.0339936	0.0472670	0.0404742
19	0.0281095	0.0343629	0.0340821
20	0.0357307	0.0383667	0.0342357

ABERDEEN 1

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0383667	0.0357307	0.0380461
-19	0.0343628	0.0281095	0.0305940
-18	0.0472670	0.0339936	0.0251350
-17	0.0426793	0.0410682	0.0345175
-16	0.0446881	0.0382133	0.0365646
-15	0.0345428	0.0323838	0.0352100
-14	0.0358687	0.0522328	0.0506876
-13	0.0462656	0.0791790	0.0791502
-12	0.0573800	0.0782136	0.0757593
-11	0.0627293	0.0720254	0.0638101
-10	0.0820144	0.0771728	0.0638834
-9	0.1299738	0.0951332	0.0881613
-8	0.2523428	0.1618061	0.1263592
-7	0.4200314	0.3929996	0.2942747
-6	0.9095381	0.8727438	0.6872812
-5	2.0103019	1.2911193	0.8696387
-4	10.2196647	3.5826629	1.4315374
-3	47.9258404	11.5172087	3.3456086
-2	146.6065502	25.3786039	4.9282635
-1	358.7483864	47.6787319	9.0379821
0	387.1686134	45.1102705	13.1539875
1	176.9118347	32.0631666	10.4408157
2	101.9967575	23.7091522	7.2738684
3	38.8668160	10.3524971	3.1975331
4	9.5555704	3.5982273	1.2189594
5	2.5610044	1.3972341	0.6884835
6	1.0978140	0.6489867	0.4574072
7	0.4651871	0.3459856	0.2835481
8	0.2349432	0.1714545	0.1502733
9	0.1460026	0.1103469	0.1015710
10	0.0835941	0.0983589	0.0949005
11	0.0636440	0.0710358	0.0634980
12	0.0580606	0.0488183	0.0386571
13	0.0565208	0.0450519	0.0347279
14	0.0360553	0.0327582	0.0311405
15	0.0349721	0.0264079	0.0346501
16	0.0396937	0.0240074	0.0305493
17	0.0429934	0.0342975	0.0295009
18	0.0282404	0.0358539	0.0324825
19	0.0298364	0.0315925	0.0274236
20	0.0274538	0.0278198	0.0253197

ABERDEEN 1

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0332687	0.0281385	0.0263513
-19	0.0274642	0.0248273	0.0258882
-18	0.0229779	0.0276259	0.0317652
-17	0.0261456	0.0275483	0.0325832
-16	0.0309326	0.0311448	0.0348620
-15	0.0346666	0.0329370	0.0305813
-14	0.0441501	0.0414079	0.0356227
-13	0.0656859	0.0448933	0.0384691
-12	0.0618913	0.0421126	0.0446534
-11	0.0501960	0.0502251	0.0566099
-10	0.0589808	0.0756922	0.0869337
-9	0.0745816	0.0932598	0.1086516
-8	0.1115809	0.1207822	0.1113805
-7	0.2138034	0.1736781	0.1209630
-6	0.3946417	0.2472104	0.1503801
-5	0.4688126	0.2812661	0.1693939
-4	0.6951615	0.5080618	0.3048529
-3	1.1488654	0.8137832	0.5962611
-2	1.7977951	1.2450608	1.0285755
-1	4.1893657	3.1408068	2.8132848
0	7.2666095	5.4395682	5.1389312
1	4.9211357	3.2498768	3.0752149
2	2.9591005	1.7627579	1.1949056
3	1.6078945	1.2055740	0.9496831
4	0.6642014	0.5239009	0.7123193
5	0.4283145	0.2643856	0.3163558
6	0.3155664	0.1723274	0.1215059
7	0.2076794	0.1330003	0.1123732
8	0.1449020	0.1044646	0.0906931
9	0.0996086	0.0753146	0.0661809
10	0.0677038	0.0489952	0.0493455
11	0.0456714	0.0430598	0.0549519
12	0.0307581	0.0383399	0.0500409
13	0.0304607	0.0389410	0.0433605
14	0.0344376	0.0361005	0.0302052
15	0.0442588	0.0362837	0.0243639
16	0.0347306	0.0268522	0.0246356
17	0.0307977	0.0324066	0.0324956
18	0.0295569	0.0335998	0.0312070
19	0.0271212	0.0353817	0.0354224
20	0.0265758	0.0347515	0.0386289

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

7 8 9

-20	0.0257613	0.0202447	0.0209777
-19	0.0258624	0.0264372	0.0283459
-18	0.0311400	0.0290091	0.0298243
-17	0.0281876	0.0296648	0.0332417
-16	0.0329375	0.0285413	0.0327781
-15	0.0275111	0.0361779	0.0469889
-14	0.0337025	0.0351654	0.0509169
-13	0.0395529	0.0399245	0.0536742
-12	0.0496744	0.0465937	0.0389607
-11	0.0582595	0.0644613	0.0552461
-10	0.0773310	0.0671114	0.0606974
-9	0.0816157	0.0801263	0.0936118
-8	0.0847913	0.0742155	0.0994154
-7	0.0956388	0.0870363	0.0944140
-6	0.1144812	0.1145315	0.0952369
-5	0.1266999	0.1675449	0.1683079
-4	0.2871038	0.3068571	0.2858534
-3	0.6150948	0.5970255	0.5740639
-2	1.0428883	0.9570691	0.8637099
-1	2.2123089	2.2628976	2.3704804
0	4.1029652	4.2824042	4.4424255
1	3.5000469	4.1802165	3.4853306
2	1.6553764	2.5932249	2.0782286
3	0.7404244	0.8476619	0.9516550
4	0.5225415	0.3102607	0.4168478
5	0.3407775	0.2395892	0.2891974
6	0.1760392	0.1914387	0.2036704
7	0.1246300	0.1295693	0.1084381
8	0.0942666	0.0985079	0.0831090
9	0.0699735	0.0662157	0.0557290
10	0.0529135	0.0509568	0.0504832
11	0.0643587	0.0496464	0.0366499
12	0.0514121	0.0476478	0.0411456
13	0.0350289	0.0266271	0.0281004
14	0.0246361	0.0326463	0.0350144
15	0.0256876	0.0280867	0.0292249
16	0.0311049	0.0397421	0.0418367
17	0.0354184	0.0369101	0.0374377
18	0.0280050	0.0367238	0.0336206
19	0.0319480	0.0344340	0.0312889
20	0.0317058	0.0345954	0.0367707

ABERDEEN 1

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0246967	0.0233697	0.0270424
-19	0.0314059	0.0289618	0.0282020
-18	0.0393519	0.0451680	0.0424658
-17	0.0392413	0.0400600	0.0395814
-16	0.0377313	0.0427453	0.0395985
-15	0.0383117	0.0331491	0.0300876
-14	0.0451591	0.0402192	0.0371232
-13	0.0508752	0.0460693	0.0440455
-12	0.0355362	0.0384914	0.0395369
-11	0.0407405	0.0304371	0.0252659
-10	0.0569127	0.0479117	0.0327005
-9	0.0837175	0.0621380	0.0472184
-8	0.1083097	0.0926335	0.0828890
-7	0.0998407	0.1180519	0.1160082
-6	0.0753483	0.1200046	0.1337713
-5	0.1539150	0.1771588	0.1663732
-4	0.3245636	0.4003229	0.3029212
-3	0.5274687	0.5674822	0.4314462
-2	0.7882790	0.7562298	0.5638332
-1	2.4007970	1.8836803	1.2917308
0	4.0619400	2.9474705	2.1749087
1	2.3212430	1.5718932	1.2638099
2	0.9874966	0.6426898	0.6441858
3	0.7499514	0.5814906	0.5570794
4	0.4530448	0.3517100	0.3164995
5	0.3067640	0.2404223	0.2342096
6	0.2100328	0.1752247	0.1722367
7	0.1034101	0.1123442	0.1020864
8	0.0818217	0.0879462	0.0720443
9	0.0629921	0.0768958	0.0742151
10	0.0526936	0.0638023	0.0686471
11	0.0394955	0.0461899	0.0554692
12	0.0432640	0.0350221	0.0388435
13	0.0403398	0.0412517	0.0446805
14	0.0366557	0.0329766	0.0322527
15	0.0341955	0.0348637	0.0319473
16	0.0325289	0.0254091	0.0294606
17	0.0321206	0.0246880	0.0271558
18	0.0300637	0.0253919	0.0314820
19	0.0365419	0.0363890	0.0420552
20	0.0403132	0.0360718	0.0373620

ABERDEEN 1

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0293677	0.0297808	0.0286747
-19	0.0308797	0.0309043	0.0292338
-18	0.0378954	0.0311691	0.0281128
-17	0.0371560	0.0321067	0.0380672
-16	0.0276127	0.0316309	0.0434074
-15	0.0271653	0.0417063	0.0484001
-14	0.0329516	0.0512941	0.0469142
-13	0.0317333	0.0376330	0.0375764
-12	0.0280459	0.0321067	0.0397391
-11	0.0232046	0.0324071	0.0513126
-10	0.0311472	0.0485362	0.0701915
-9	0.0520365	0.0586180	0.0798387
-8	0.0829483	0.0770658	0.0947436
-7	0.0953151	0.0894380	0.1284669
-6	0.1103559	0.1011119	0.1478229
-5	0.1708155	0.1493232	0.1609701
-4	0.2438885	0.2337732	0.2508107
-3	0.3169427	0.3361767	0.4337983
-2	0.4329746	0.3931466	0.4342779
-1	1.0516924	0.8674832	0.7807641
0	1.7978243	1.5505643	1.4051325
1	1.0675715	1.0423768	1.0040811
2	0.5351865	0.5038495	0.4878373
3	0.4519963	0.4270173	0.4812434
4	0.3309060	0.3828022	0.4419337
5	0.2762479	0.2635297	0.2028640
6	0.1905674	0.1565562	0.1169273
7	0.0995434	0.1129027	0.1079088
8	0.0620233	0.0718980	0.0890772
9	0.0619225	0.0502472	0.0625397
10	0.0607133	0.0400962	0.0482072
11	0.0546664	0.0449281	0.0473621
12	0.0452656	0.0423777	0.0464672
13	0.0479702	0.0483434	0.0452600
14	0.0366648	0.0345436	0.0376233
15	0.0371400	0.0340221	0.0283257
16	0.0387311	0.0306332	0.0253266
17	0.0315258	0.0272609	0.0226674
18	0.0363730	0.0253639	0.0223564
19	0.0437887	0.0324484	0.0210349
20	0.0381613	0.0339078	0.0230359

ABERDEEN 1

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 16 TO 18

	16	17	18
-20	0.0311131	0.0315058	0.0303450
-19	0.0320050	0.0321471	0.0280771
-18	0.0323936	0.0318400	0.0321995
-17	0.0387377	0.0274356	0.0290400
-16	0.0423374	0.0309779	0.0291646
-15	0.0356632	0.0278477	0.0338258
-14	0.0298374	0.0301204	0.0402334
-13	0.0348258	0.0465179	0.0544700
-12	0.0481607	0.0700497	0.0858292
-11	0.0572813	0.0599676	0.0672238
-10	0.0680570	0.0540092	0.0488212
-9	0.0787570	0.0638308	0.0555349
-8	0.0988841	0.0984423	0.0911435
-7	0.1305907	0.1287067	0.1327503
-6	0.1547458	0.1446573	0.1458467
-5	0.1741192	0.1472550	0.1438692
-4	0.2647177	0.2428830	0.2192468
-3	0.4257984	0.3579899	0.3203534
-2	0.4673993	0.4908851	0.4760160
-1	0.6648124	0.6595109	0.6315914
0	1.0507628	0.8238309	0.6892039
1	0.8344093	0.7885109	0.6777073
2	0.4961061	0.5859755	0.5866534
3	0.4887014	0.4632540	0.4502878
4	0.3813454	0.3154534	0.3017457
5	0.1832388	0.1814306	0.1757539
6	0.1147905	0.1246388	0.1247753
7	0.1095425	0.1110759	0.0958781
8	0.1044279	0.0881704	0.0687791
9	0.0825533	0.0791454	0.0820645
10	0.0647154	0.0745781	0.0821974
11	0.0521436	0.0623040	0.0613520
12	0.0553628	0.0592090	0.0413795
13	0.0553251	0.0652672	0.0448618
14	0.0503517	0.0531498	0.0382531
15	0.0381850	0.0388871	0.0323350
16	0.0302166	0.0304137	0.0308131
17	0.0238342	0.0266291	0.0256844
18	0.0253851	0.0230591	0.0250677
19	0.0261074	0.0284068	0.0286068
20	0.0259861	0.0285486	0.0316625

ABERDEEN 1

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 19 TO 21

	19	20	21
-20	0.0313828	0.0285176	0.
-19	0.0272223	0.0264370	0.
-18	0.0325598	0.0279430	0.
-17	0.0315641	0.0245279	0.
-16	0.0285395	0.0243104	0.
-15	0.0357228	0.0325789	0.
-14	0.0467582	0.0443348	0.
-13	0.0574596	0.0509646	0.
-12	0.0749854	0.0556984	0.
-11	0.0605105	0.0476754	0.
-10	0.0599040	0.0614403	0.
-9	0.0722839	0.0796949	0.
-8	0.0786199	0.0737540	0.
-7	0.0835455	0.0706128	0.
-6	0.1083271	0.0971388	0.
-5	0.1889523	0.1977556	0.
-4	0.2447439	0.2482429	0.
-3	0.3177641	0.2944727	0.
-2	0.5152062	0.5370281	0.
-1	0.5323121	0.5524264	0.
0	0.4797850	0.4387938	0.
1	0.5414007	0.4721823	0.
2	0.5377045	0.5207231	0.
3	0.4081773	0.4206351	0.
4	0.2946810	0.2884251	0.
5	0.2096932	0.2188908	0.
6	0.1383121	0.1268437	0.
7	0.0971311	0.0817463	0.
8	0.0785695	0.0744080	0.
9	0.0855457	0.0756488	0.
10	0.0803386	0.0757377	0.
11	0.0598366	0.0611414	0.
12	0.0363083	0.0363007	0.
13	0.0289255	0.0257001	0.
14	0.0318487	0.0318515	0.
15	0.0416948	0.0451661	0.
16	0.0417981	0.0433553	0.
17	0.0339542	0.0359854	0.
18	0.0301690	0.0337683	0.
19	0.0302155	0.0308973	0.
20	0.0307728	0.0297898	0.

ABERDEEN 2

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS -2 TO -0

	-2	-1	0
-20	0.0743054	0.0708393	0.0595038
-19	0.1084097	0.1011915	0.0774864
-18	0.1268283	0.1255911	0.1102049
-17	0.1325654	0.1074179	0.1030235
-16	0.1383869	0.1188853	0.1025851
-15	0.1356610	0.1426038	0.1165331
-14	0.0962707	0.0924363	0.0958991
-13	0.0758306	0.0744857	0.0928864
-12	0.0735147	0.1082429	0.1578135
-11	0.1051727	0.1561569	0.2129002
-10	0.1660107	0.2312500	0.3257459
-9	0.2022388	0.3225246	0.5990151
-8	0.1991903	0.3408803	0.6383777
-7	0.2179398	0.3522593	0.5761743
-6	0.2838203	0.4288296	0.7009215
-5	0.5990654	0.8160261	1.0321509
-4	1.2983709	1.9814663	1.8760685
-3	3.8927696	5.4098781	5.1154030
-2	18.3147862	18.7220552	17.0516348
-1	79.0035963	123.1675091	142.2067280
0	112.8339157	488.8446007	217.8251572
1	51.7477341	117.0818882	142.2067184
2	14.0895617	18.1684973	17.0516338
3	3.0069965	4.1838364	5.1154027
4	1.0872036	1.4740255	1.8760685
5	0.4810254	0.7867245	1.0321509
6	0.3692588	0.5770292	0.7009215
7	0.3690671	0.5198358	0.5761742
8	0.4099894	0.5900781	0.6383777
9	0.4464726	0.6279109	0.5990151
10	0.3199062	0.3685296	0.3257459
11	0.1594400	0.2036361	0.2129002
12	0.1257499	0.1664957	0.1578135
13	0.0978101	0.1165352	0.0928864
14	0.1197419	0.1135722	0.0958991
15	0.1624007	0.1037734	0.1165331
16	0.1752184	0.1155001	0.1025851
17	0.1430601	0.1328912	0.1030235
18	0.1037102	0.1047692	0.1102049
19	0.0597437	0.0573658	0.0774864
20	0.0631260	0.0562004	0.0595038

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0562004	0.0631259	0.0541328
-19	0.0573658	0.0597437	0.0620134
-18	0.1047692	0.1037102	0.1033848
-17	0.1328912	0.1430601	0.1353739
-16	0.1155001	0.1752184	0.1753325
-15	0.1037734	0.1624007	0.1735457
-14	0.1135722	0.1197419	0.1194233
-13	0.1165353	0.0978101	0.0853628
-12	0.1664957	0.1257499	0.0899367
-11	0.2036361	0.1594400	0.1254520
-10	0.3685297	0.3199062	0.2219425
-9	0.6279109	0.4464726	0.3319846
-8	0.5900781	0.4099894	0.3432074
-7	0.5198358	0.3690671	0.2521163
-6	0.5770292	0.3692588	0.2734223
-5	0.7867246	0.4810254	0.3552686
-4	1.4740256	1.0872036	0.5494031
-3	4.1838356	3.0069964	1.0784853
-2	18.1684947	14.0895615	5.3514383
-1	117.0820522	51.7477684	26.0047507
0	488.8443451	112.8338547	57.6409593
1	123.1676817	79.0036469	41.7935910
2	18.7220521	18.3147864	11.4639678
3	5.4098770	3.8927696	1.9784536
4	1.9814663	1.2983709	0.5666785
5	0.8160261	0.5990654	0.3881913
6	0.4288296	0.2838203	0.2959131
7	0.3522593	0.2179398	0.2168312
8	0.3408803	0.1991903	0.2081636
9	0.3225246	0.2022389	0.1867097
10	0.2312500	0.1660107	0.1175860
11	0.1561569	0.1051727	0.0741795
12	0.1082429	0.0735147	0.0598936
13	0.0744856	0.0758306	0.0686569
14	0.0924363	0.0962707	0.1107965
15	0.1426038	0.1356610	0.1485586
16	0.1188853	0.1383869	0.1468632
17	0.1074179	0.1325653	0.1250070
18	0.1259911	0.1268283	0.1163335
19	0.1011915	0.1084097	0.1033588
20	0.0708393	0.0743054	0.0686436

ABERDEEN 2

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0457539	0.0596948	0.0765529
-19	0.0666980	0.0729976	0.0769338
-18	0.1169901	0.1107575	0.0883637
-17	0.1588560	0.1484034	0.1044740
-16	0.1523806	0.1348309	0.1073795
-15	0.1689065	0.1334806	0.1042968
-14	0.1366928	0.1184284	0.1164389
-13	0.0844844	0.0719081	0.0798920
-12	0.0683147	0.0621214	0.0625942
-11	0.0948227	0.0925573	0.0773210
-10	0.1700942	0.1598467	0.1192758
-9	0.3098031	0.2225577	0.1481581
-8	0.3082578	0.2429700	0.1886050
-7	0.1982380	0.2021276	0.1766616
-6	0.2216075	0.2115998	0.1908398
-5	0.2593486	0.2410887	0.1982629
-4	0.2339643	0.2284039	0.2269167
-3	0.3118317	0.3380941	0.4108939
-2	1.5370810	0.7853413	0.7672264
-1	13.4320400	4.7202604	1.8567151
0	29.5646057	10.3107179	3.6183653
1	17.3779602	6.0812518	2.7026721
2	4.4459181	1.5477606	0.8803145
3	0.8856216	0.4536080	0.3366179
4	0.3489801	0.2953416	0.2973811
5	0.2935626	0.2687614	0.2240237
6	0.2718551	0.2146341	0.1714333
7	0.1925958	0.1651374	0.1885550
8	0.1512076	0.1253232	0.1685889
9	0.1231862	0.0886270	0.1001424
10	0.0861853	0.1021914	0.0941297
11	0.0700615	0.1186531	0.1214157
12	0.0604645	0.0869069	0.0861822
13	0.0507162	0.0581194	0.0621388
14	0.0934525	0.0688769	0.0613179
15	0.1539358	0.1463764	0.1146208
16	0.1424854	0.1645110	0.1287344
17	0.0842270	0.0929589	0.0927549
18	0.0906569	0.0857476	0.0694453
19	0.0845371	0.0901880	0.0736147
20	0.0634247	0.0717676	0.0630734

ABERDEEN 2
THE CORRECTED SPECTRUM, (F-STAR)

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COLUMNS 7 TO 9

	7	8	9
-20	0.0779450	0.0702540	0.0412511
-19	0.0772379	0.0762345	0.0550229
-18	0.0739695	0.0792051	0.0709494
-17	0.0815242	0.1115655	0.0966265
-16	0.0904842	0.1103225	0.0956075
-15	0.1009992	0.0933306	0.0791423
-14	0.1345340	0.1170037	0.0838525
-13	0.1114357	0.1086832	0.0852126
-12	0.0643960	0.0628287	0.0643875
-11	0.0535888	0.0529512	0.0650909
-10	0.0906188	0.0819466	0.0809099
-9	0.1235246	0.1053113	0.1128981
-8	0.1269084	0.0882933	0.1093672
-7	0.1362246	0.1040126	0.1002015
-6	0.1636980	0.1261586	0.1120657
-5	0.1587473	0.1528416	0.1459550
-4	0.1982889	0.2175793	0.2203231
-3	0.3467149	0.3386810	0.3150238
-2	0.5767537	0.4392785	0.3333858
-1	1.2312998	1.2389344	1.1998470
0	2.1718406	2.2505217	2.2952055
1	1.7514337	1.5808729	1.3426357
2	0.7441375	0.6933921	0.4422924
3	0.2989253	0.2684439	0.1972207
4	0.2470260	0.1744666	0.1562545
5	0.1772216	0.1229896	0.1047611
6	0.1520257	0.1113383	0.0874907
7	0.1665049	0.1154192	0.0832458
8	0.1475700	0.1462481	0.1610498
9	0.1025291	0.1297143	0.1689104
10	0.0870549	0.1141291	0.1271403
11	0.1038550	0.1412319	0.1256425
12	0.0819072	0.1096164	0.0936498
13	0.0648871	0.0733373	0.0529463
14	0.0564205	0.0570007	0.0481087
15	0.0673286	0.0531554	0.0593181
16	0.0701145	0.0645512	0.0880391
17	0.0731455	0.0629795	0.0794358
18	0.0560138	0.0538049	0.0507355
19	0.0554999	0.0628431	0.0512291
20	0.0563080	0.0689162	0.0592425

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0329113	0.0468523	0.0544895
-19	0.0432168	0.0492131	0.0553971
-18	0.0634390	0.0496456	0.0498323
-17	0.0709226	0.0545143	0.0543456
-16	0.0593880	0.0516675	0.0566203
-15	0.0551954	0.0462717	0.0488550
-14	0.0644350	0.0611262	0.0658748
-13	0.0721539	0.0728107	0.0713602
-12	0.0647588	0.0668528	0.0608379
-11	0.0599462	0.0594648	0.0637703
-10	0.0645157	0.0555962	0.0682686
-9	0.1039605	0.0773276	0.0618212
-8	0.1283221	0.1022240	0.0623817
-7	0.1130167	0.0972665	0.0634608
-6	0.1016903	0.0776932	0.0581986
-5	0.1308435	0.1060245	0.0926227
-4	0.1813410	0.1297573	0.1094139
-3	0.2351729	0.1838987	0.1403964
-2	0.2750446	0.2812425	0.2318199
-1	0.8030274	0.4992883	0.4591503
0	1.5489755	0.8274261	0.7544518
1	0.9378727	0.6087899	0.5245765
2	0.2849361	0.2501873	0.2095568
3	0.1318528	0.1005287	0.1180660
4	0.1241122	0.1089465	0.1376976
5	0.0984853	0.1110954	0.1404540
6	0.0744010	0.0876829	0.1105902
7	0.0733866	0.0855023	0.0950854
8	0.1327740	0.1012614	0.0870602
9	0.1581308	0.1103856	0.0811972
10	0.1259675	0.1001263	0.0679559
11	0.0846776	0.0687673	0.0600799
12	0.0572382	0.0483100	0.0461186
13	0.0331673	0.0349817	0.0465628
14	0.0333653	0.0458832	0.0684812
15	0.0555764	0.0579867	0.0771130
16	0.0793651	0.0623798	0.0659217
17	0.0697057	0.0615752	0.0553414
18	0.0446186	0.0531121	0.0453614
19	0.0363422	0.0495601	0.0551729
20	0.0409697	0.0565958	0.0670757

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0507649	0.0558101	0.0609762
-19	0.0589422	0.0630147	0.0555049
-18	0.0618041	0.0727929	0.0604606
-17	0.0562209	0.0659051	0.0546799
-16	0.0543323	0.0511936	0.0426224
-15	0.0493482	0.0440673	0.0488565
-14	0.0478058	0.0397762	0.0546052
-13	0.0604091	0.0568695	0.0487706
-12	0.0617766	0.0537394	0.0409612
-11	0.0689581	0.0482607	0.0431318
-10	0.0780562	0.0563899	0.0472318
-9	0.0695712	0.0735614	0.0686677
-8	0.0617082	0.0729162	0.1021610
-7	0.0549458	0.0575715	0.0992100
-6	0.0574915	0.0606951	0.0882639
-5	0.1036484	0.1145544	0.1158405
-4	0.1130048	0.1468276	0.1643009
-3	0.1185529	0.1526297	0.1811955
-2	0.1702687	0.2200188	0.2782209
-1	0.5291860	0.6059876	0.5140405
0	0.9229181	0.9402079	0.6978213
1	0.5371938	0.5712734	0.4852295
2	0.1930569	0.2511726	0.2341281
3	0.1202352	0.1404055	0.1626876
4	0.1093020	0.1130340	0.1627232
5	0.1017616	0.1000296	0.1427137
6	0.1039946	0.1096540	0.1048742
7	0.1332768	0.1490417	0.0970293
8	0.1228376	0.1391282	0.1022208
9	0.0930778	0.0977513	0.0968247
10	0.0752548	0.0722761	0.0642455
11	0.0537159	0.0580680	0.0583874
12	0.0447456	0.0512273	0.0518142
13	0.0455969	0.0370120	0.0383926
14	0.0571465	0.0370090	0.0390092
15	0.0707102	0.0498786	0.0442643
16	0.0667835	0.0499846	0.0376353
17	0.0462331	0.0345660	0.0354370
18	0.0426053	0.0437614	0.0531889
19	0.0486324	0.0525564	0.0688738
20	0.0544402	0.0584294	0.0803557

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 16 TO 18

	16	17	18
-20	0.0564720	0.0445448	0.0468086
-19	0.0488736	0.0457570	0.0466668
-18	0.0464629	0.0487280	0.0521151
-17	0.0426271	0.0461848	0.0567265
-16	0.0374983	0.0403006	0.0575694
-15	0.0481531	0.0394381	0.0455485
-14	0.0525481	0.0267730	0.0290285
-13	0.0407076	0.0314085	0.0324440
-12	0.0378099	0.0408653	0.0436177
-11	0.0478515	0.0452818	0.0490129
-10	0.0501335	0.0457988	0.0507989
-9	0.0657108	0.0647022	0.0618348
-8	0.0931780	0.0742906	0.0781412
-7	0.1117697	0.0905736	0.0908332
-6	0.1144931	0.1077837	0.0899780
-5	0.1082215	0.1047951	0.0909339
-4	0.1302014	0.0996431	0.0930708
-3	0.1460629	0.1092954	0.1084555
-2	0.2722140	0.2424515	0.1880670
-1	0.4534730	0.5320258	0.5351751
0	0.5379362	0.6378690	0.7811717
1	0.3777352	0.3614116	0.4067258
2	0.1957638	0.1742753	0.1526653
3	0.1578220	0.1202279	0.0858762
4	0.1653563	0.1050160	0.0561780
5	0.1540561	0.1190470	0.0748437
6	0.1096702	0.1239566	0.1041308
7	0.0746916	0.0809661	0.0751672
8	0.0648574	0.0589414	0.0695611
9	0.0717796	0.0782791	0.1035656
10	0.0702646	0.1066202	0.1345761
11	0.0762640	0.1007971	0.1060895
12	0.0708744	0.0803806	0.0624421
13	0.0541303	0.0559694	0.0509553
14	0.0433287	0.0472520	0.0479298
15	0.0396695	0.0415885	0.0371477
16	0.0354601	0.0396010	0.0388768
17	0.0432649	0.0435266	0.0424250
18	0.0611219	0.0478673	0.0371990
19	0.0777287	0.0636794	0.0387296
20	0.0866289	0.0704404	0.0423171

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 19 TO 21

	19	20	21
-20	0.0573713	0.0595749	0.
-19	0.0442506	0.0425680	0.
-18	0.0403490	0.0345807	0.
-17	0.0532820	0.0432708	0.
-16	0.0639919	0.0547322	0.
-15	0.0510622	0.0490659	0.
-14	0.0438430	0.0496635	0.
-13	0.0470606	0.0531043	0.
-12	0.0501503	0.0565429	0.
-11	0.0569855	0.0582737	0.
-10	0.0647727	0.0640764	0.
-9	0.0576368	0.0567302	0.
-8	0.0726975	0.0695997	0.
-7	0.0928982	0.0943792	0.
-6	0.0731095	0.0686386	0.
-5	0.0793438	0.0755718	0.
-4	0.1005666	0.1031612	0.
-3	0.1017591	0.0942739	0.
-2	0.1083256	0.0784992	0.
-1	0.3573219	0.2320560	0.
0	0.6604056	0.4724736	0.
1	0.3761336	0.2977621	0.
2	0.1388816	0.1249842	0.
3	0.0815905	0.0819385	0.
4	0.0505607	0.0620932	0.
5	0.0596325	0.0726189	0.
6	0.0627025	0.0468177	0.
7	0.0493885	0.0323885	0.
8	0.0688376	0.0593809	0.
9	0.1045835	0.0960993	0.
10	0.0976389	0.0793709	0.
11	0.0666847	0.0537599	0.
12	0.0477027	0.0495032	0.
13	0.0581133	0.0612034	0.
14	0.0501321	0.0514926	0.
15	0.0323214	0.0334341	0.
16	0.0325525	0.0281517	0.
17	0.0367869	0.0285680	0.
18	0.0313281	0.0248403	0.
19	0.0283274	0.0244529	0.
20	0.0303714	0.0251610	0.

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THE CORRECTED SPECTRUM, (F-STAR)

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COLUMNS -2 TO -0

	-2	-1	0
-20	0.1272107	0.0864814	0.0844855
-19	0.2010619	0.1304863	0.0909311
-18	0.1932322	0.1628502	0.1228667
-17	0.1419995	0.1474041	0.1581444
-16	0.1998643	0.1856363	0.1526455
-15	0.2280674	0.1900898	0.1333186
-14	0.1790974	0.1497012	0.1082088
-13	0.1149561	0.1033960	0.0900108
-12	0.1197504	0.0936101	0.1059158
-11	0.2663172	0.2114950	0.1611224
-10	0.5925099	0.5385110	0.2940069
-9	1.1497118	0.9830367	0.5480918
-8	1.3676932	1.2360228	0.8796579
-7	1.0122930	1.1040975	1.1046756
-6	0.7162222	0.9113233	1.2338899
-5	0.7232239	0.9385373	1.3122940
-4	1.4249908	2.0962933	2.3556215
-3	3.5167292	6.9591979	7.1229646
-2	8.1449935	20.1443622	25.2384474
-1	14.3806163	67.6661806	194.5325775
0	19.1320381	192.1740417	194.5325794
1	15.5062995	55.6951785	25.2384479
2	9.9295180	16.0265045	7.1229647
3	3.9568072	5.2020443	2.3556215
4	1.3362298	1.9177225	1.3122940
5	0.6849147	1.0358326	1.2338899
6	0.5550323	0.8582522	1.1046756
7	0.4830385	0.7305766	0.8796579
8	0.3848409	0.5747663	0.5480918
9	0.3077211	0.3810546	0.2940069
10	0.2401798	0.2227862	0.1611224
11	0.2104368	0.1960426	0.1059158
12	0.1557494	0.1568108	0.0900108
13	0.1168016	0.1097577	0.1082088
14	0.1335438	0.1139984	0.1333186
15	0.1808916	0.1462657	0.1526455
16	0.2744058	0.2101301	0.1581444
17	0.2458591	0.2051493	0.1228667
18	0.1376253	0.1318486	0.0909312
19	0.0688005	0.0850268	0.0844855
20	0.0706619	0.0769692	

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0769692	0.0706619	0.0746394
-19	0.0850268	0.0688005	0.0750857
-18	0.1318486	0.1376253	0.1307370
-17	0.2051493	0.2458591	0.2037846
-16	0.2101301	0.2744057	0.2080846
-15	0.1462657	0.1808916	0.1573641
-14	0.1139984	0.1335438	0.1210458
-13	0.1097578	0.1168016	0.1066033
-12	0.1568108	0.1557494	0.0967056
-11	0.1960426	0.2104368	0.1358051
-10	0.2227862	0.2401798	0.1932147
-9	0.3810546	0.3077211	0.2807809
-8	0.5747663	0.3848409	0.4161863
-7	0.7305766	0.4830385	0.4850798
-6	0.8582522	0.5550323	0.4617475
-5	1.0358326	0.6849147	0.4693919
-4	1.9177224	1.3362299	0.8099744
-3	5.2020433	3.9568072	1.9856123
-2	16.0265019	9.9295180	4.1207638
-1	55.6952553	15.5063092	5.3001947
0	192.1739407	19.1320283	5.3724184
1	67.6662760	14.3806255	6.2729246
2	20.1443591	8.1449934	5.0321791
3	6.9591967	3.5167292	2.2442219
4	2.0962933	1.4249908	1.2115444
5	0.9385373	0.7232240	0.9731313
6	0.9113234	0.7162222	0.9000147
7	1.1040975	1.0122930	0.8863152
8	1.2360229	1.3676933	0.9755242
9	0.9830367	1.1497118	0.8389395
10	0.5385110	0.5925099	0.4927411
11	0.2114950	0.2663172	0.2685119
12	0.0936101	0.1197504	0.1403630
13	0.1033960	0.1149561	0.0957424
14	0.1497012	0.1790974	0.1553587
15	0.1900898	0.2280674	0.2145525
16	0.1856363	0.1998643	0.2121421
17	0.1474041	0.1419996	0.1695699
18	0.1628502	0.1932322	0.1619064
19	0.1304863	0.2010619	0.1669440
20	0.0864814	0.1272108	0.1273565

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0598721	0.0534923	0.0571420
-19	0.0716032	0.0693797	0.0753291
-18	0.1284656	0.1191770	0.1242553
-17	0.1776155	0.1405380	0.1305327
-16	0.1752970	0.1426170	0.1180612
-15	0.1146493	0.0930880	0.0973491
-14	0.0690591	0.0589222	0.0893358
-13	0.0683922	0.0528928	0.0703528
-12	0.0672077	0.0611197	0.0587076
-11	0.0937755	0.0816663	0.0535272
-10	0.1280717	0.0888543	0.0768712
-9	0.1967944	0.1238017	0.1080584
-8	0.3265937	0.1849999	0.1402236
-7	0.4103553	0.2493693	0.1571921
-6	0.4287665	0.3160897	0.1985019
-5	0.4172999	0.3145055	0.2128228
-4	0.4968512	0.3330056	0.2255911
-3	0.8184550	0.4242771	0.2496342
-2	1.2525779	0.5171044	0.3374651
-1	1.6466021	0.5588398	0.3388922
0	2.1918710	0.8540229	0.4299859
1	4.0949972	2.1946326	0.9294254
2	4.1386778	3.0180928	1.6836408
3	1.6899977	1.5513428	1.3773080
4	0.7858310	0.6087477	0.7053279
5	0.8303102	0.6894067	0.6218869
6	0.6691388	0.7645505	1.1036397
7	0.4897207	0.6768697	1.2714997
8	0.5156120	0.4389988	0.6411617
9	0.5230557	0.3232734	0.2620016
10	0.3750592	0.2886550	0.1937584
11	0.2145048	0.2061212	0.1412944
12	0.1124205	0.1111544	0.1050124
13	0.0771137	0.0806668	0.1206692
14	0.1243051	0.1172672	0.1251296
15	0.2011105	0.1888996	0.1495726
16	0.2792737	0.2944583	0.2124978
17	0.2535326	0.2993751	0.2269423
18	0.1399991	0.1547816	0.1444613
19	0.0987554	0.1027557	0.1176172
20	0.0823059	0.0884054	0.0973968

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

	7	8	9
-20	0.0564868	0.0501840	0.0507205
-19	0.0744033	0.0632723	0.0584369
-18	0.1110722	0.0852098	0.0700733
-17	0.1174556	0.0973151	0.0819857
-16	0.1042882	0.0875643	0.0762492
-15	0.0906858	0.0717018	0.0693983
-14	0.0833703	0.0622659	0.0600472
-13	0.0680823	0.0626518	0.0543479
-12	0.0568287	0.0612461	0.0604138
-11	0.0565950	0.0571142	0.0474702
-10	0.0905506	0.0683797	0.0421562
-9	0.1007125	0.0796094	0.0645835
-8	0.1244402	0.1042024	0.0903090
-7	0.1466364	0.1362894	0.1157512
-6	0.1665140	0.1465228	0.1238415
-5	0.1617892	0.1256715	0.1006429
-4	0.1478299	0.1113609	0.0928473
-3	0.1591024	0.1398960	0.1036195
-2	0.1884144	0.1497379	0.1213056
-1	0.2152143	0.1591764	0.1458143
0	0.2841817	0.1842551	0.1580712
1	0.3819932	0.2155680	0.1896794
2	0.7446987	0.3753708	0.2860966
3	0.9600953	0.6063291	0.4312045
4	0.7043938	0.5438879	0.4542093
5	0.5093301	0.3517390	0.2995677
6	0.7425468	0.3218443	0.1932292
7	0.9779208	0.3337389	0.1372194
8	0.5976501	0.2808618	0.1331633
9	0.2583123	0.2148783	0.1337742
10	0.1445123	0.1623767	0.1684509
11	0.1061132	0.1431529	0.1819801
12	0.1084740	0.1252833	0.1335618
13	0.1437617	0.1082140	0.1019401
14	0.1418444	0.1090803	0.0934615
15	0.1236866	0.0995698	0.0938206
16	0.1274320	0.1136747	0.1079087
17	0.1353126	0.1237658	0.1269655
18	0.1205490	0.1030120	0.1022178
19	0.0901769	0.0831680	0.0605207
20	0.0663836	0.0485954	0.0442519

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0485654	0.0399553	0.0341383
-19	0.0632739	0.0529608	0.0436185
-18	0.0760804	0.0616187	0.0549902
-17	0.0644195	0.0483566	0.0555648
-16	0.0592501	0.0465203	0.0508764
-15	0.0609360	0.0601275	0.0697712
-14	0.0541081	0.0604749	0.0748228
-13	0.0510636	0.0586150	0.0634225
-12	0.0720739	0.0704272	0.0501424
-11	0.0522239	0.0620729	0.0553393
-10	0.0357476	0.0514252	0.0546550
-9	0.0515943	0.0487047	0.0370917
-8	0.0759010	0.0559409	0.0474973
-7	0.0773878	0.0510449	0.0601478
-6	0.0799135	0.0587309	0.0667351
-5	0.0685097	0.0493805	0.0493351
-4	0.0710147	0.0480933	0.0402422
-3	0.0741985	0.0612944	0.0522726
-2	0.0941277	0.0763607	0.0608828
-1	0.1277868	0.1006561	0.0714529
0	0.1284681	0.0925775	0.0608936
1	0.1190692	0.0690194	0.0579227
2	0.1641388	0.0859354	0.0874906
3	0.2599189	0.1448315	0.1533360
4	0.3724217	0.2621220	0.2191775
5	0.3394437	0.3246724	0.2940645
6	0.1733225	0.1999202	0.2389425
7	0.0888014	0.0986167	0.1314930
8	0.0883848	0.0863915	0.0898081
9	0.1131821	0.1053096	0.0843158
10	0.1433025	0.1074536	0.0964557
11	0.1693444	0.1353450	0.1305075
12	0.1576024	0.1968305	0.2151757
13	0.1355276	0.1727906	0.2119473
14	0.1090328	0.1083221	0.1304261
15	0.0928326	0.0929706	0.0905446
16	0.0791723	0.0771308	0.0653007
17	0.0884564	0.0623479	0.0519741
18	0.0813527	0.0579593	0.0528159
19	0.0576028	0.0616686	0.0565913
20	0.0412005	0.0558549	0.0581100

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0284687	0.0322691	0.0430109
-19	0.0311517	0.0282661	0.0357402
-18	0.0401660	0.0323075	0.0320749
-17	0.0511564	0.0403152	0.0400783
-16	0.0480080	0.0374338	0.0515893
-15	0.0613508	0.0412006	0.0452535
-14	0.0684958	0.0414497	0.0323572
-13	0.0644631	0.0457504	0.0371529
-12	0.0507377	0.0572471	0.0482397
-11	0.0497008	0.0660495	0.0686000
-10	0.0522952	0.0570788	0.0695390
-9	0.0421722	0.0407206	0.0600482
-8	0.0452506	0.0440618	0.0572399
-7	0.0462291	0.0394464	0.0497817
-6	0.0523241	0.0353917	0.0391719
-5	0.0452867	0.0382255	0.0334249
-4	0.0433260	0.0315016	0.0296438
-3	0.0518094	0.0388089	0.0416997
-2	0.0567804	0.0572971	0.0615985
-1	0.0761259	0.0815055	0.0766169
0	0.0612259	0.0715219	0.0886182
1	0.0556533	0.0625944	0.0883034
2	0.0927885	0.0789636	0.0655195
3	0.1654249	0.1204147	0.0593194
4	0.1826915	0.1360820	0.0966396
5	0.2214255	0.1204352	0.0919957
6	0.2130904	0.1035011	0.0630223
7	0.1587235	0.1094743	0.0820838
8	0.1194315	0.1219123	0.0923271
9	0.0738392	0.1131050	0.0936134
10	0.0766357	0.0843818	0.0800377
11	0.1052957	0.0727709	0.0684234
12	0.1711366	0.1003697	0.0623784
13	0.1793737	0.1030696	0.0549608
14	0.1154749	0.0743919	0.0527153
15	0.0780432	0.0610681	0.0543666
16	0.0666699	0.0568860	0.0397881
17	0.0564270	0.0533845	0.0397300
18	0.0601330	0.0545349	0.0467567
19	0.0653051	0.0695204	0.0564650
20	0.0673247	0.0737883	0.0573761

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THE CORRECTED SPECTRUM, (F-STAR)

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COLUMNS 16 TO 18

	16	17	18
-20	0.0387676	0.0362570	0.0301265
-19	0.0398422	0.0374602	0.0371986
-18	0.0378125	0.0376572	0.0465919
-17	0.0398475	0.0376286	0.0473649
-16	0.0538551	0.0433784	0.0432568
-15	0.0611732	0.0550376	0.0377001
-14	0.0486392	0.0500128	0.0376566
-13	0.0463868	0.0430294	0.0352414
-12	0.0393438	0.0377297	0.0387886
-11	0.0458879	0.0431520	0.0479858
-10	0.0532641	0.0450224	0.0470383
-9	0.0652575	0.0624218	0.0565721
-8	0.0795126	0.0745079	0.0646492
-7	0.0771183	0.0800352	0.0616840
-6	0.0586801	0.0646976	0.0435060
-5	0.0386320	0.0429029	0.0291759
-4	0.0472100	0.0586301	0.0411238
-3	0.0507776	0.0628344	0.0570150
-2	0.0670296	0.0698278	0.0616415
-1	0.0934516	0.0986776	0.0665297
0	0.1028590	0.0976407	0.0770950
1	0.1112169	0.1111828	0.0932637
2	0.0770464	0.0780362	0.0647454
3	0.0484705	0.0469258	0.0385972
4	0.0868403	0.0715782	0.0512806
5	0.1153084	0.1043859	0.0632617
6	0.0776980	0.0917937	0.0795121
7	0.0616303	0.0586053	0.0669318
8	0.0558662	0.0486230	0.0591752
9	0.0608952	0.0496162	0.0523861
10	0.0838645	0.0673388	0.0451895
11	0.0791287	0.0660996	0.0433860
12	0.0562468	0.0480152	0.0352000
13	0.0468131	0.0448044	0.0339244
14	0.0457168	0.0442016	0.0407049
15	0.0444784	0.0418728	0.0464402
16	0.0365774	0.0438191	0.0502657
17	0.0406204	0.0486731	0.0493279
18	0.0459661	0.0449832	0.0400872
19	0.0417674	0.0342783	0.0339377
20	0.0391068	0.0329399	0.0364138

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 19 TO 21

	19	20	21
-20	0.0372017	0.0440921	0.
-19	0.0408050	0.0405318	0.
-18	0.0423934	0.0356298	0.
-17	0.0382228	0.0319543	0.
-16	0.0365011	0.0298433	0.
-15	0.0368760	0.0409617	0.
-14	0.0448968	0.0600199	0.
-13	0.0453724	0.0548783	0.
-12	0.0442591	0.0459265	0.
-11	0.0429406	0.0409090	0.
-10	0.0417502	0.0355348	0.
-9	0.0496844	0.0398904	0.
-8	0.0502407	0.0449174	0.
-7	0.0373499	0.0401172	0.
-6	0.0337309	0.0464373	0.
-5	0.0286839	0.0419349	0.
-4	0.0312596	0.0355824	0.
-3	0.0463109	0.0475183	0.
-2	0.0566057	0.0611135	0.
-1	0.0581802	0.0649105	0.
0	0.0626728	0.0565123	0.
1	0.0669941	0.0443763	0.
2	0.0524302	0.0356022	0.
3	0.0449135	0.0455810	0.
4	0.0450785	0.0439474	0.
5	0.0361847	0.0323148	0.
6	0.0471168	0.0297697	0.
7	0.0679898	0.0496751	0.
8	0.0744014	0.0695827	0.
9	0.0576226	0.0643085	0.
10	0.0453341	0.0536131	0.
11	0.0450861	0.0502529	0.
12	0.0399290	0.0454096	0.
13	0.0329771	0.0378452	0.
14	0.0380370	0.0379366	0.
15	0.0440040	0.0403837	0.
16	0.0457613	0.0449186	0.
17	0.0453822	0.0432554	0.
18	0.0421495	0.0405826	0.
19	0.0403090	0.0388356	0.
20	0.0424230	0.0401267	0.

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THE CORRECTED SPECTRUM, (F-STAR)

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COLUMNS -2 TO -0

-2

-1

0

-20	0.0070581	0.0105714	0.0098282
-19	0.0062749	0.0085756	0.0098886
-18	0.0069679	0.0072791	0.0090191
-17	0.0088049	0.0088917	0.0087310
-16	0.0073754	0.0073702	0.0087848
-15	0.0071530	0.0076052	0.0098128
-14	0.0086548	0.0091549	0.0133187
-13	0.0106120	0.0111207	0.0142220
-12	0.0124117	0.0144142	0.0152064
-11	0.0146030	0.0154355	0.0152793
-10	0.0201077	0.0198589	0.0170468
-9	0.0247354	0.0227797	0.0195338
-8	0.0309576	0.0270114	0.0251610
-7	0.0426797	0.0425972	0.0384874
-6	0.0470874	0.0532012	0.0584598
-5	0.0625143	0.0809758	0.1141492
-4	0.0877669	0.1456647	0.2256570
-3	0.2669641	0.3898418	0.4809730
-2	0.8780789	1.7661244	1.9425514
-1	4.6125424	14.6153409	25.6133523
0	12.5290922	75.9200468	
1	5.9286816	14.7980665	25.6133525
2	1.5507860	2.1246417	1.9425514
3	0.7103546	0.6135511	0.4809730
4	0.3564850	0.2655522	0.2256570
5	0.1340037	0.1297927	0.1141492
6	0.0728431	0.0697025	0.0584598
7	0.0553185	0.0494811	0.0384874
8	0.0320669	0.0308129	0.0251610
9	0.0178098	0.0177520	0.0195338
10	0.0142318	0.0145080	0.0170468
11	0.0130455	0.0144338	0.0152793
12	0.0113678	0.0146147	0.0152064
13	0.0102180	0.0138129	0.0142220
14	0.0133004	0.0151780	0.0133187
15	0.0125247	0.0133751	0.0098128
16	0.0094259	0.0110502	0.0087848
17	0.0090064	0.0097845	0.0087310
18	0.0109496	0.0107743	0.0090191
19	0.0084056	0.0089587	0.0098886
20	0.0062236	0.0070566	0.0098282

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0070566	0.0062236	0.0083846
-19	0.0089587	0.0084056	0.0085496
-18	0.0107743	0.0109496	0.0081190
-17	0.0097845	0.0090064	0.0073432
-16	0.0110502	0.0094259	0.0076523
-15	0.0133751	0.0125247	0.0100748
-14	0.0151780	0.0133004	0.0123361
-13	0.0138129	0.0102180	0.0112762
-12	0.0146147	0.0113678	0.0108135
-11	0.0144338	0.0130455	0.0142382
-10	0.0145080	0.0142318	0.0181572
-9	0.0177520	0.0178098	0.0242179
-8	0.0308129	0.0320669	0.0357342
-7	0.0494811	0.0553185	0.0539886
-6	0.0697025	0.0728431	0.0850776
-5	0.1297927	0.1340037	0.1708625
-4	0.2655522	0.3564850	0.3841622
-3	0.6135510	0.7103546	0.5325553
-2	2.1246413	1.5507860	0.6755601
-1	14.7980872	5.9286854	2.3291498
0	75.9200087	12.5290855	4.4793640
1	14.6153620	4.6125455	1.8248643
2	1.7661242	0.8780791	0.3613890
3	0.3898418	0.2669642	0.1708880
4	0.1456647	0.0877669	0.0607165
5	0.0809758	0.0625143	0.0450157
6	0.0532012	0.0470674	0.0329301
7	0.0425972	0.0426797	0.0291237
8	0.0270114	0.0309576	0.0265843
9	0.0227797	0.0247354	0.0243186
10	0.0198589	0.0201077	0.0193686
11	0.0154355	0.0146030	0.0129261
12	0.0144142	0.0124117	0.0108747
13	0.0111207	0.0106120	0.0093943
14	0.0091549	0.0086548	0.0080964
15	0.0076052	0.0071530	0.0065677
16	0.0078702	0.0073754	0.0055891
17	0.0088917	0.0088049	0.0063110
18	0.0072791	0.0069679	0.0077073
19	0.0085756	0.0062749	0.0064600
20	0.0105714	0.0070581	0.0058216

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0093619	0.0073998	0.0054893
-19	0.0083758	0.0076465	0.0061776
-18	0.0072074	0.0086163	0.0083474
-17	0.0089694	0.0096522	0.0088169
-16	0.0100445	0.0095355	0.0076405
-15	0.0119678	0.0102363	0.0067319
-14	0.0148313	0.0128920	0.0077840
-13	0.0150325	0.0135953	0.0096845
-12	0.0133916	0.0140479	0.0152418
-11	0.0155296	0.0157525	0.0187391
-10	0.0215866	0.0268185	0.0268352
-9	0.0304499	0.0462362	0.0445213
-8	0.0456924	0.0646090	0.0594680
-7	0.0743930	0.0766215	0.0555124
-6	0.1111677	0.0713757	0.0388349
-5	0.1421638	0.0740930	0.0515573
-4	0.2147403	0.1154015	0.0964006
-3	0.2594315	0.1341274	0.1138036
-2	0.2770351	0.1613186	0.1559064
-1	1.0633673	0.6876467	0.4991864
0	2.0331474	1.2727109	0.8170590
1	0.8697347	0.5672021	0.3627931
2	0.1307611	0.0888902	0.0613468
3	0.0887976	0.0692483	0.0684787
4	0.0617470	0.0655193	0.0720718
5	0.0365616	0.0414037	0.0434504
6	0.0259299	0.0293979	0.0292128
7	0.0223619	0.0309971	0.0302355
8	0.0217781	0.0286512	0.0275852
9	0.0210348	0.0197637	0.0206473
10	0.0173349	0.0145423	0.0160653
11	0.0129208	0.0128856	0.0130974
12	0.0098221	0.0105840	0.0111384
13	0.0061701	0.0063551	0.0084423
14	0.0060529	0.0052482	0.0070148
15	0.0062681	0.0059978	0.0073653
16	0.0053910	0.0058338	0.0068066
17	0.0053452	0.0060548	0.0077273
18	0.0068975	0.0069762	0.0078993
19	0.0059027	0.0067386	0.0064512
20	0.0051611	0.0063744	0.0060227

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

	7	8	9
-20	0.0055708	0.0049059	0.0082446
-19	0.0058806	0.0057088	0.0076918
-18	0.0075728	0.0064265	0.0070184
-17	0.0102358	0.0095372	0.0089919
-16	0.0093250	0.0111016	0.0103499
-15	0.0067637	0.0082952	0.0093739
-14	0.0074421	0.0090816	0.0113279
-13	0.0113890	0.0148242	0.0178284
-12	0.0160415	0.0160213	0.0165610
-11	0.0202103	0.0158084	0.0124013
-10	0.0214587	0.0167385	0.0151182
-9	0.0244247	0.0173951	0.0166086
-8	0.0285246	0.0179760	0.0162899
-7	0.0288256	0.0215414	0.0240676
-6	0.0322923	0.0319135	0.0265597
-5	0.0543607	0.0513748	0.0334464
-4	0.0805801	0.0586424	0.0458328
-3	0.0977407	0.0637066	0.0515180
-2	0.1478143	0.0945958	0.0544320
-1	0.4364416	0.3126429	0.2085860
0	0.6893901	0.5320568	0.3904810
1	0.3034022	0.2598935	0.1973588
2	0.0509584	0.0583839	0.0517429
3	0.0536547	0.0391014	0.0414503
4	0.0595241	0.0410529	0.0404954
5	0.0377572	0.0319822	0.0298117
6	0.0244464	0.0231119	0.0183823
7	0.0208051	0.0203003	0.0156303
8	0.0190152	0.0184344	0.0183002
9	0.0180558	0.0165418	0.0175482
10	0.0149851	0.0122962	0.0115644
11	0.0109700	0.0080259	0.0091873
12	0.0107463	0.0084023	0.0096978
13	0.0109610	0.0100842	0.0084389
14	0.0089964	0.0089046	0.0089694
15	0.0075422	0.0072336	0.0090436
16	0.0072732	0.0076480	0.0092702
17	0.0074354	0.0077888	0.0076919
18	0.0082868	0.0087942	0.0073390
19	0.0075788	0.0092509	0.0076513
20	0.0069126	0.0084489	0.0072707

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

	10	11	12
-20	0.0106864	0.0094777	0.0085927
-19	0.0094823	0.0097914	0.0086333
-18	0.0072507	0.0077501	0.0082455
-17	0.0073904	0.0063304	0.0074168
-16	0.0077112	0.0056027	0.0059523
-15	0.0084777	0.0067699	0.0083726
-14	0.0091316	0.0056095	0.0086290
-13	0.0124178	0.0072846	0.0096065
-12	0.0123110	0.0089108	0.0107783
-11	0.0140396	0.0130240	0.0130890
-10	0.0158075	0.0129241	0.0124620
-9	0.0154708	0.0157801	0.0142305
-8	0.0151535	0.0169361	0.0166503
-7	0.0268335	0.0267710	0.0213649
-6	0.0292595	0.0346265	0.0279594
-5	0.0312338	0.0443127	0.0378318
-4	0.0388518	0.0478531	0.0410468
-3	0.0382326	0.0338765	0.0296193
-2	0.0364056	0.0352532	0.0329451
-1	0.1769629	0.1825897	0.1541685
0	0.3550461	0.3499864	0.2926788
1	0.1782697	0.1678830	0.1482118
2	0.0431029	0.0386255	0.0412767
3	0.0384872	0.0301156	0.0324384
4	0.0367392	0.0275287	0.0268521
5	0.0226209	0.0186365	0.0198596
6	0.0148706	0.0185488	0.0193750
7	0.0145447	0.0172824	0.0185483
8	0.0188796	0.0173116	0.0160901
9	0.0185421	0.0159372	0.0126097
10	0.0138504	0.0159033	0.0128775
11	0.0128407	0.0145024	0.0134279
12	0.0137239	0.0141815	0.0119275
13	0.0103899	0.0108260	0.0089670
14	0.0102201	0.0103355	0.0094502
15	0.0097534	0.0077752	0.0074099
16	0.0091203	0.0079122	0.0068528
17	0.0065596	0.0072098	0.0071628
18	0.0062753	0.0076810	0.0079871
19	0.0055424	0.0051872	0.0063127
20	0.0055412	0.0054544	0.0065208

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0070231	0.0057194	0.0057668
-19	0.0059610	0.0046819	0.0052158
-18	0.0058657	0.0036928	0.0047861
-17	0.0066274	0.0049840	0.0053318
-16	0.0069718	0.0062077	0.0059092
-15	0.0099104	0.0087701	0.0091987
-14	0.0120893	0.0118252	0.0123177
-13	0.0113268	0.0109500	0.0119686
-12	0.0113688	0.0096641	0.0112789
-11	0.0146486	0.0120354	0.0107051
-10	0.0167559	0.0150404	0.0107752
-9	0.0132689	0.0146776	0.0151478
-8	0.0133593	0.0162820	0.0186825
-7	0.0169495	0.0191010	0.0212940
-6	0.0211936	0.0209861	0.0239473
-5	0.0256426	0.0275546	0.0322745
-4	0.0282267	0.0291173	0.0399763
-3	0.0259607	0.0274374	0.0338151
-2	0.0283633	0.0289029	0.0328114
-1	0.1481070	0.1413862	0.1388570
0	0.3086516	0.2794686	0.2542610
1	0.1638790	0.1403509	0.1124694
2	0.0418402	0.0368000	0.0250797
3	0.0436636	0.0457366	0.0325698
4	0.0395501	0.0463670	0.0355843
5	0.0229116	0.0268375	0.0267333
6	0.0179351	0.0251077	0.0265387
7	0.0163394	0.0204731	0.0219567
8	0.0157184	0.0134883	0.0131140
9	0.0121174	0.0105735	0.0129070
10	0.0091545	0.0089753	0.0112562
11	0.0101374	0.0082053	0.0096708
12	0.0100533	0.0101065	0.0116504
13	0.0093577	0.0112918	0.0123679
14	0.0107038	0.0109071	0.0100280
15	0.0098368	0.0087747	0.0072654
16	0.0066161	0.0074282	0.0075612
17	0.0057467	0.0067421	0.0082276
18	0.0069555	0.0072749	0.0083676
19	0.0064114	0.0067772	0.0082877
20	0.0059368	0.0062321	0.0083906

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 16 TO 18

	16	17	18
-20	0.0053124	0.0054413	0.0064385
-19	0.0049046	0.0048642	0.0058880
-18	0.0063394	0.0070588	0.0077913
-17	0.0087570	0.0111685	0.0105063
-16	0.0083041	0.0103840	0.0094908
-15	0.0091472	0.0076934	0.0077460
-14	0.0107330	0.0087176	0.0085746
-13	0.0106258	0.0095226	0.0094445
-12	0.0132107	0.0124607	0.0101827
-11	0.0134716	0.0149298	0.0112631
-10	0.0115222	0.0157069	0.0137569
-9	0.0158064	0.0212213	0.0191897
-8	0.0175901	0.0229433	0.0196646
-7	0.0172852	0.0176946	0.0162295
-6	0.0207765	0.0186560	0.0174060
-5	0.0308260	0.0241325	0.0202031
-4	0.0429821	0.0322002	0.0277164
-3	0.0309149	0.0257560	0.0258754
-2	0.0262336	0.0211998	0.0211503
-1	0.1135899	0.0994579	0.1094569
0	0.2147878	0.1977477	0.2265415
1	0.1018378	0.0980103	0.1090359
2	0.0235470	0.0230596	0.0202938
3	0.0299989	0.0288360	0.0233218
4	0.0293833	0.0287771	0.0285280
5	0.0222761	0.0218497	0.0226647
6	0.0185704	0.0183572	0.0192581
7	0.0189440	0.0201244	0.0177935
8	0.0165383	0.0197493	0.0172055
9	0.0155831	0.0159720	0.0163217
10	0.0127518	0.0105702	0.0113408
11	0.0132615	0.0109702	0.0092923
12	0.0137004	0.0118564	0.0084345
13	0.0109242	0.0104634	0.0088872
14	0.0082050	0.0091414	0.0106781
15	0.0072201	0.0099402	0.0112286
16	0.0071036	0.0091937	0.0104898
17	0.0077907	0.0075868	0.0096135
18	0.0079097	0.0071149	0.0077422
19	0.0072643	0.0069518	0.0067644
20	0.0072725	0.0075226	0.0072907

YUMA 1

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 19 TO 21

	19	20	21
-20	0.0070607	0.0076281	0.
-19	0.0066442	0.0074532	0.
-18	0.0083231	0.0084512	0.
-17	0.0093300	0.0084041	0.
-16	0.0088397	0.0082133	0.
-15	0.0092234	0.0095544	0.
-14	0.0081172	0.0080301	0.
-13	0.0073829	0.0060897	0.
-12	0.0098392	0.0105293	0.
-11	0.0101927	0.0124605	0.
-10	0.0106918	0.0124290	0.
-9	0.0133970	0.0143007	0.
-8	0.0132424	0.0138669	0.
-7	0.0128200	0.0133641	0.
-6	0.0161009	0.0160364	0.
-5	0.0181710	0.0158327	0.
-4	0.0261558	0.0199267	0.
-3	0.0271478	0.0245819	0.
-2	0.0245603	0.0275837	0.
-1	0.1054496	0.1083446	0.
0	0.2190931	0.2156223	0.
1	0.1148584	0.1154192	0.
2	0.0238387	0.0263950	0.
3	0.0180655	0.0170791	0.
4	0.0201485	0.0164073	0.
5	0.0160017	0.0136827	0.
6	0.0142236	0.0159924	0.
7	0.0118471	0.0132135	0.
8	0.0119513	0.0109714	0.
9	0.0133024	0.0117355	0.
10	0.0113102	0.0112931	0.
11	0.0105157	0.0113597	0.
12	0.0087377	0.0098327	0.
13	0.0079376	0.0079981	0.
14	0.0089054	0.0073344	0.
15	0.0082574	0.0069286	0.
16	0.0085470	0.0084160	0.
17	0.0099584	0.0099334	0.
18	0.0082562	0.0085167	0.
19	0.0068888	0.0076252	0.
20	0.0075615	0.0087987	0.

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS -2 TO -0

	-2	-1	0
-20	0.0147366	0.0183268	0.0209916
-19	0.0182679	0.0224397	0.0251402
-18	0.0241137	0.0256593	0.0268164
-17	0.0219783	0.0210580	0.0213306
-16	0.0187748	0.0188691	0.0219886
-15	0.0219180	0.0197896	0.0205671
-14	0.0231250	0.0210783	0.0190432
-13	0.0314533	0.0278856	0.0248677
-12	0.0472032	0.0365187	0.0307545
-11	0.0468598	0.0388961	0.0279536
-10	0.0352893	0.0330884	0.0295558
-9	0.0376462	0.0416611	0.0371883
-8	0.0520555	0.0506486	0.0426580
-7	0.0750989	0.0647117	0.0522794
-6	0.1255604	0.0911355	0.0783859
-5	0.1735073	0.1323212	0.1321101
-4	0.1873067	0.1937058	0.2294413
-3	0.4659277	0.5369685	0.6918494
-2	3.2905561	5.2234664	5.6811014
-1	19.7790504	112.4179773	384.9695282
0	36.2784343	672.8579330	
1	12.9262917	89.1281948	384.9695320
2	1.9112820	4.2056748	5.6811018
3	0.5384576	0.7972379	0.6918495
4	0.2511723	0.2902168	0.2294414
5	0.1348946	0.1504073	0.1321101
6	0.0865057	0.0841018	0.0783859
7	0.0545854	0.0490964	0.0522794
8	0.0388512	0.0366511	0.0426580
9	0.0272338	0.0328362	0.0371883
10	0.0260933	0.0289589	0.0295558
11	0.0307038	0.0274463	0.0279536
12	0.0284259	0.0338867	0.0307545
13	0.0229693	0.0286406	0.0248677
14	0.0207981	0.0223772	0.0190432
15	0.0288332	0.0267861	0.0205671
16	0.0303044	0.0273596	0.0219886
17	0.0206754	0.0215512	0.0213306
18	0.0181283	0.0227287	0.0268164
19	0.0212593	0.0252637	0.0251402
20	0.0260068	0.0257581	0.0209916

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 1 TO 3

	1	2	3
-20	0.0257581	0.0260068	0.0224641
-19	0.0252637	0.0212593	0.0195531
-18	0.0227287	0.0181283	0.0211938
-17	0.0215511	0.0206754	0.0227575
-16	0.0273596	0.0303044	0.0263095
-15	0.0267861	0.0288332	0.0263944
-14	0.0223772	0.0207981	0.0223498
-13	0.0286406	0.0229693	0.0214359
-12	0.0338867	0.0284259	0.0300089
-11	0.0274463	0.0307038	0.0374736
-10	0.0289589	0.0260933	0.0250378
-9	0.0328362	0.0272338	0.0254685
-8	0.0366511	0.0388512	0.0426354
-7	0.0490964	0.0545854	0.0600724
-6	0.0841018	0.0865057	0.0909467
-5	0.1504073	0.1348946	0.1304313
-4	0.2902168	0.2511723	0.1993594
-3	0.7972376	0.5384576	0.3592684
-2	4.2056738	1.9112819	0.9261363
-1	89.1283188	12.9263000	5.2284830
0	472.8575592	36.2784133	11.2036422
1	112.4181328	19.7790630	6.3572212
2	5.2234659	3.2905563	1.5291963
3	0.5369686	0.4659279	0.3847577
4	0.1937058	0.1873067	0.1754918
5	0.1323212	0.1735073	0.1239280
6	0.0911355	0.1255604	0.1028350
7	0.0647117	0.0750989	0.0750960
8	0.0506486	0.0520555	0.0563139
9	0.0416611	0.0376462	0.0360827
10	0.0330884	0.0352893	0.0323983
11	0.0388961	0.0468598	0.0409988
12	0.0365187	0.0472032	0.0402153
13	0.0278856	0.0314533	0.0230988
14	0.0210783	0.0231250	0.0193881
15	0.0197896	0.0219180	0.0231767
16	0.0188691	0.0187748	0.0209426
17	0.0210580	0.0219783	0.0219651
18	0.0256593	0.0241137	0.0237234
19	0.0224397	0.0182680	0.0151090
20	0.0183268	0.0147366	0.0136286

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 4 TO 6

	4	5	6
-20	0.0200626	0.0209604	0.0238335
-19	0.0220355	0.0228892	0.0215575
-18	0.0251552	0.0262584	0.0200327
-17	0.0211731	0.0218220	0.0204419
-16	0.0180966	0.0185838	0.0260739
-15	0.0226016	0.0218300	0.0278255
-14	0.0262830	0.0234162	0.0237929
-13	0.0262457	0.0240637	0.0248516
-12	0.0341404	0.0295940	0.0258222
-11	0.0370993	0.0329085	0.0283648
-10	0.0277282	0.0347900	0.0310639
-9	0.0343710	0.0463176	0.0372396
-8	0.0472195	0.0460210	0.0383938
-7	0.0613692	0.0432537	0.0307482
-6	0.0914288	0.0737568	0.0442424
-5	0.1378082	0.1210861	0.0852283
-4	0.1742014	0.1501186	0.1194893
-3	0.2513673	0.1926713	0.1398983
-2	0.4952187	0.3226853	0.2228771
-1	2.4322026	0.8887837	0.7172713
0	4.8605050	1.5137436	1.3309688
1	2.8594580	1.0130710	0.7539931
2	0.8062273	0.4022199	0.2416112
3	0.2668461	0.1915256	0.1520923
4	0.1416561	0.1342140	0.1203092
5	0.0769659	0.1043983	0.1103967
6	0.0703177	0.0687144	0.0638314
7	0.0608616	0.0462275	0.0400677
8	0.0439176	0.0303858	0.0373561
9	0.0352531	0.0349914	0.0352837
10	0.0331331	0.0414250	0.0379583
11	0.0321218	0.0311881	0.0332063
12	0.0295278	0.0242520	0.0231320
13	0.0226758	0.0278075	0.0222266
14	0.0227308	0.0282051	0.0248142
15	0.0289474	0.0314160	0.0251010
16	0.0238083	0.0232069	0.0181346
17	0.0216158	0.0193698	0.0155496
18	0.0238125	0.0217194	0.0177821
19	0.0179272	0.0237607	0.0226864
20	0.0185148	0.0243981	0.0241991

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 7 TO 9

	7	8	9
-20	0.0201180	0.0170275	0.0173386
-19	0.0177464	0.0169901	0.0179015
-18	0.0143925	0.0154312	0.0194253
-17	0.0172159	0.0198260	0.0246200
-16	0.0305068	0.0302955	0.0268143
-15	0.0343502	0.0343604	0.0308905
-14	0.0239273	0.0256495	0.0286379
-13	0.0225353	0.0264478	0.0287100
-12	0.0268753	0.0324391	0.0284628
-11	0.0279130	0.0299853	0.0283848
-10	0.0257172	0.0280962	0.0265689
-9	0.0285869	0.0342329	0.0343650
-8	0.0362125	0.0348543	0.0334425
-7	0.0405868	0.0472293	0.0479033
-6	0.0434576	0.0640208	0.0756311
-5	0.0691163	0.0736855	0.0716079
-4	0.1004144	0.0754015	0.0553456
-3	0.1026371	0.0854342	0.0838269
-2	0.1416024	0.1254722	0.1176069
-1	0.5468785	0.3988405	0.3809586
0	1.0664045	0.7017467	0.6656475
1	0.6408482	0.4557733	0.3905217
2	0.1985158	0.1991673	0.1521579
3	0.1268264	0.1261889	0.0942347
4	0.0904774	0.0774079	0.0665767
5	0.0644089	0.0462503	0.0386718
6	0.0511843	0.0438937	0.0341881
7	0.0455752	0.0376776	0.0344048
8	0.0520245	0.0489512	0.0407227
9	0.0445533	0.0487571	0.0370858
10	0.0323152	0.0302781	0.0278615
11	0.0328541	0.0306695	0.0245247
12	0.0304391	0.0321884	0.0244365
13	0.0224309	0.0232897	0.0214052
14	0.0194481	0.0212145	0.0285426
15	0.0181221	0.0203755	0.0290206
16	0.0142908	0.0154155	0.0233056
17	0.0154132	0.0158174	0.0187796
18	0.0201207	0.0229899	0.0198715
19	0.0196098	0.0183050	0.0159798
20	0.0184460	0.0142840	0.0147677

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 10 TO 12

10

11

12

-20	0.0206071	0.0188024	0.0131575
-19	0.0180445	0.0150503	0.0119217
-18	0.0183661	0.0155179	0.0144257
-17	0.0194320	0.0156817	0.0174479
-16	0.0200362	0.0185519	0.0182282
-15	0.0257934	0.0267643	0.0271174
-14	0.0255288	0.0278310	0.0319631
-13	0.0224729	0.0231386	0.0272709
-12	0.0234172	0.0271541	0.0285501
-11	0.0258223	0.0239992	0.0234075
-10	0.0224863	0.0237352	0.0225495
-9	0.0303731	0.0290386	0.0257430
-8	0.0310484	0.0311722	0.0305905
-7	0.0355716	0.0307854	0.0378331
-6	0.0590238	0.0411724	0.0402740
-5	0.0517438	0.0417285	0.0416417
-4	0.0488805	0.0565718	0.0579823
-3	0.0824568	0.0816876	0.0752420
-2	0.1112949	0.1057457	0.0905810
-1	0.3283863	0.3774868	0.3890289
0	0.5813122	0.7548890	0.7954129
1	0.3551623	0.4571938	0.4433824
2	0.1122926	0.1129276	0.0935344
3	0.0632148	0.0618346	0.0596695
4	0.0531363	0.0516830	0.0488938
5	0.0333731	0.0397350	0.0396755
6	0.0328568	0.0443564	0.0467589
7	0.0411947	0.0420652	0.0400434
8	0.0383495	0.0295526	0.0266644
9	0.0290209	0.0287541	0.0276356
10	0.0249386	0.0235412	0.0228713
11	0.0291489	0.0355882	0.0293368
12	0.0293531	0.0350980	0.0297541
13	0.0268433	0.0269587	0.0205626
14	0.0360714	0.0312276	0.0201815
15	0.0350412	0.0298222	0.0198373
16	0.0275324	0.0187184	0.0126664
17	0.0234295	0.0210709	0.0180953
18	0.0191902	0.0205205	0.0211826
19	0.0170342	0.0185976	0.0173416
20	0.0176464	0.0192131	0.0174161

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 13 TO 15

	13	14	15
-20	0.0138135	0.0187913	0.0212156
-19	0.0134232	0.0185610	0.0207277
-18	0.0152793	0.0187267	0.0196237
-17	0.0180948	0.0186202	0.0207598
-16	0.0181455	0.0186447	0.0220631
-15	0.0242389	0.0212137	0.0240542
-14	0.0297746	0.0239821	0.0239079
-13	0.0254224	0.0256801	0.0238894
-12	0.0259624	0.0290666	0.0273288
-11	0.0283969	0.0330108	0.0307678
-10	0.0264109	0.0310343	0.0292628
-9	0.0254200	0.0278980	0.0274118
-8	0.0333551	0.0346719	0.0314002
-7	0.0414462	0.0407331	0.0373847
-6	0.0427484	0.0390339	0.0372392
-5	0.0371350	0.0331216	0.0379808
-4	0.0494407	0.0460097	0.0410304
-3	0.0659439	0.0573596	0.0488996
-2	0.0919362	0.1062143	0.0958538
-1	0.3155221	0.3246462	0.3354494
0	0.5477226	0.4725607	0.5111475
1	0.3075510	0.2809582	0.2826260
2	0.0981707	0.1142454	0.0945172
3	0.0620384	0.0602905	0.0429307
4	0.0376946	0.0298909	0.0238513
5	0.0296627	0.0265874	0.0245691
6	0.0347422	0.0304845	0.0263233
7	0.0375168	0.0315281	0.0252664
8	0.0328973	0.0305252	0.0315638
9	0.0280882	0.0276388	0.0317478
10	0.0268868	0.0253586	0.0260205
11	0.0271181	0.0243949	0.0241802
12	0.0279903	0.0279021	0.0297137
13	0.0214373	0.0219197	0.0226373
14	0.0173777	0.0193397	0.0225023
15	0.0186926	0.0228644	0.0245694
16	0.0150734	0.0204429	0.0196998
17	0.0161044	0.0196422	0.0235398
18	0.0188831	0.0204996	0.0280960
19	0.0172860	0.0176335	0.0207658
20	0.0159938	0.0161634	0.0188156

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THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 16 TO 18

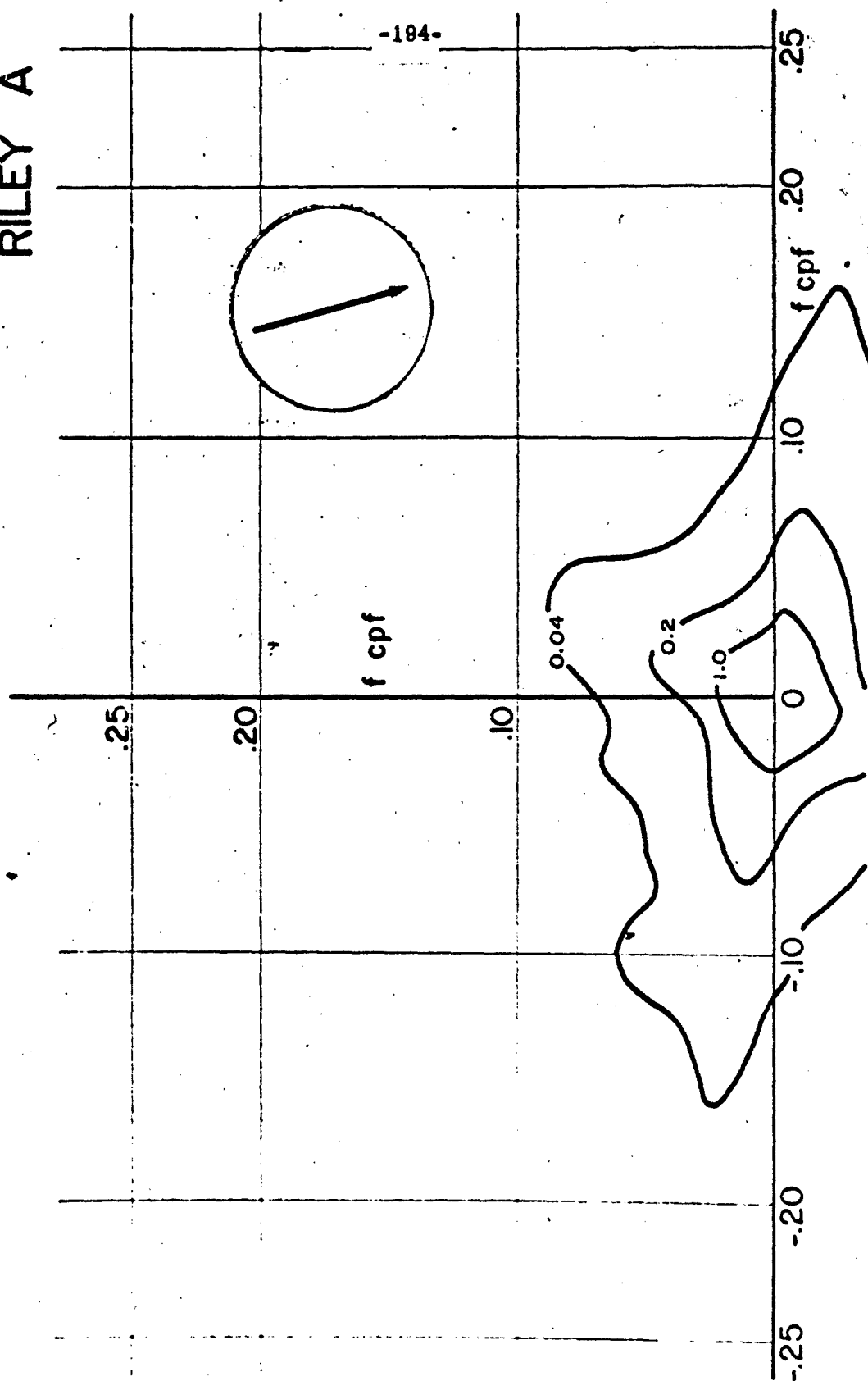
	16	17	18
-20	0.0175210	0.0141239	0.0150464
-19	0.0159988	0.0144360	0.0166053
-18	0.0167070	0.0159709	0.0194154
-17	0.0196668	0.0165106	0.0178439
-16	0.0209756	0.0172503	0.0186742
-15	0.0239890	0.0214877	0.0217651
-14	0.0247584	0.0208252	0.0186370
-13	0.0223732	0.0213959	0.0203281
-12	0.0209229	0.0226293	0.0261093
-11	0.0243640	0.0268335	0.0296806
-10	0.0294413	0.0278359	0.0260897
-9	0.0274384	0.0272405	0.0282074
-8	0.0270444	0.0259220	0.0289039
-7	0.0340487	0.0371019	0.0429154
-6	0.0383115	0.0449601	0.0498114
-5	0.0406082	0.0469148	0.0509506
-4	0.0407289	0.0396328	0.0433115
-3	0.0448129	0.0395367	0.0378795
-2	0.0831960	0.0868085	0.0733807
-1	0.3073666	0.3452572	0.3738297
0	0.4633564	0.4906546	0.6155693
1	0.2303791	0.2472107	0.3557941
2	0.0651278	0.0794220	0.1115352
3	0.0373373	0.0405098	0.0441264
4	0.0277572	0.0315612	0.0339950
5	0.0264499	0.0265586	0.0255295
6	0.0279019	0.0299479	0.0304182
7	0.0289191	0.0302710	0.0325101
8	0.0357182	0.0367567	0.0342234
9	0.0304774	0.0286684	0.0248205
10	0.0292091	0.0285102	0.0188145
11	0.0305088	0.0298469	0.0204559
12	0.0324184	0.0290934	0.0243034
13	0.0264600	0.0238542	0.0232352
14	0.0254737	0.0238434	0.0232587
15	0.0242747	0.0211017	0.0208917
16	0.0161775	0.0169190	0.0197144
17	0.0214768	0.0192246	0.0200203
18	0.0252437	0.0191662	0.0205691
19	0.0182629	0.0162892	0.0174786
20	0.0167277	0.0180698	0.0191875

THE CORRECTED SPECTRUM, (F-STAR)

COLUMNS 19 TO 21

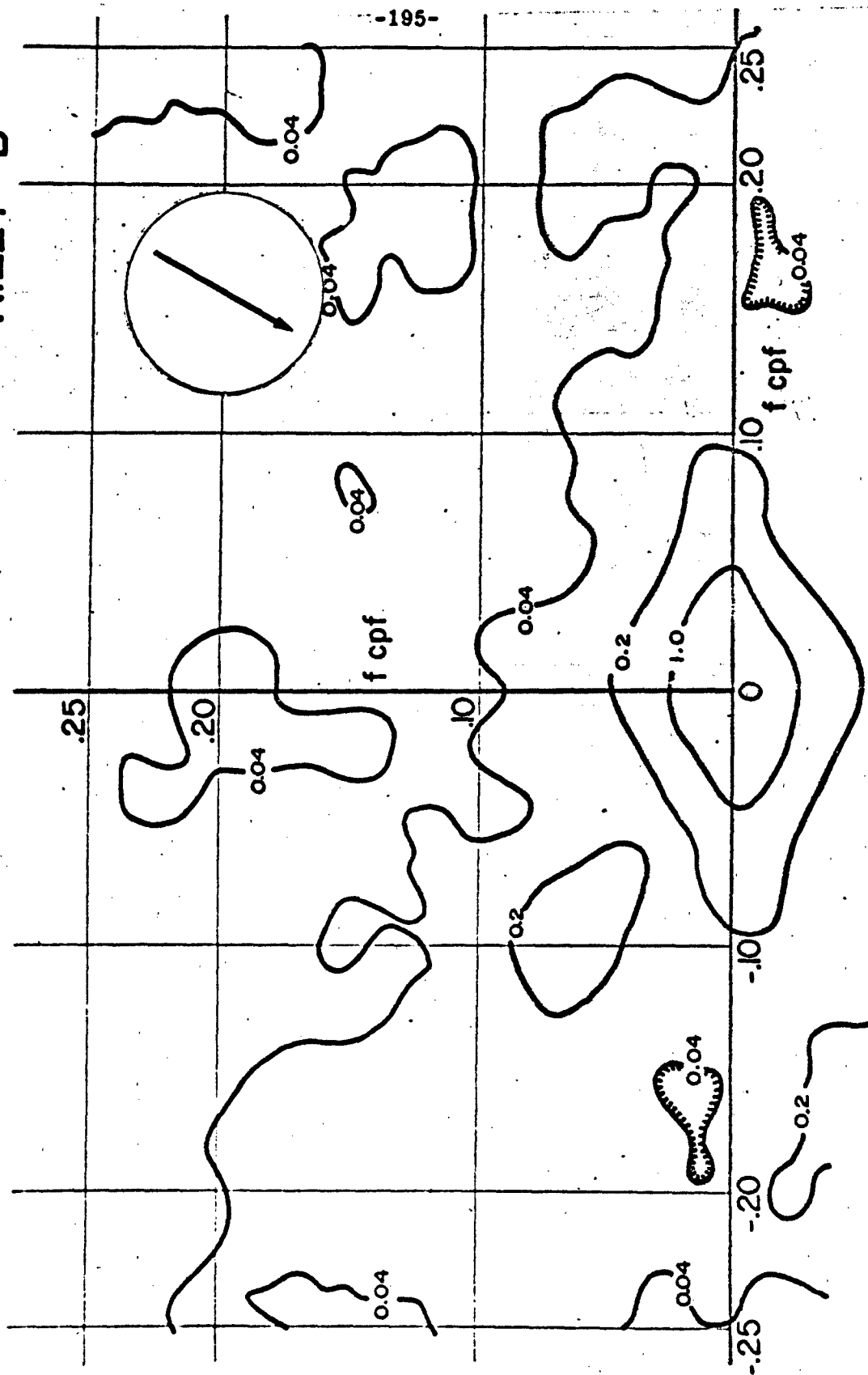
	19	20	21
-20	0.0179299	0.0205259	0.
-19	0.0181861	0.0191396	0.
-18	0.0207984	0.0206800	0.
-17	0.0198053	0.0204453	0.
-16	0.0191659	0.0175013	0.
-15	0.0230127	0.0227513	0.
-14	0.0236502	0.0269820	0.
-13	0.0235269	0.0250468	0.
-12	0.0267423	0.0264749	0.
-11	0.0235951	0.0220097	0.
-10	0.0236411	0.0229745	0.
-9	0.0317751	0.0328319	0.
-8	0.0336087	0.0369942	0.
-7	0.0466461	0.0502998	0.
-6	0.0514254	0.0548781	0.
-5	0.0500519	0.0506629	0.
-4	0.0480549	0.0467501	0.
-3	0.0456989	0.0463133	0.
-2	0.0734828	0.0861421	0.
-1	0.3448867	0.3465841	0.
0	0.6020262	0.5745192	0.
1	0.3502243	0.3133793	0.
2	0.1056994	0.0921583	0.
3	0.0575361	0.0667021	0.
4	0.0487693	0.0608772	0.
5	0.0298543	0.0380403	0.
6	0.0278987	0.0325060	0.
7	0.0270689	0.0262219	0.
8	0.0250262	0.0194951	0.
9	0.0194416	0.0150260	0.
10	0.0133875	0.0113230	0.
11	0.0159346	0.0132159	0.
12	0.0229044	0.0191673	0.
13	0.0235121	0.0207081	0.
14	0.0224214	0.0224060	0.
15	0.0250907	0.0301344	0.
16	0.0229132	0.0261236	0.
17	0.0206487	0.0204608	0.
18	0.0209942	0.0198516	0.
19	0.0164779	0.0164287	0.
20	0.0168672	0.0165761	0.

RILEY A



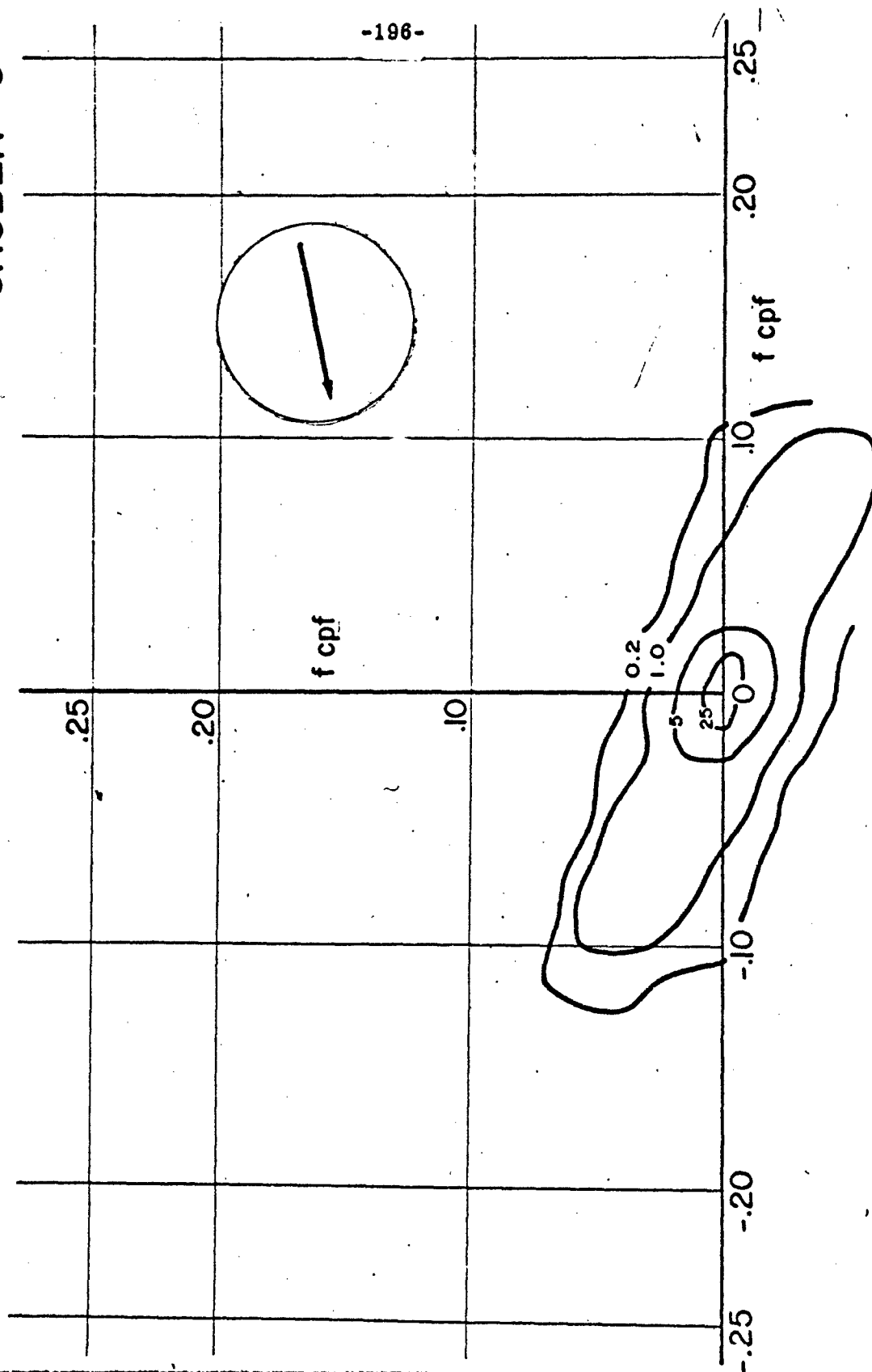
RILEY B

-195-



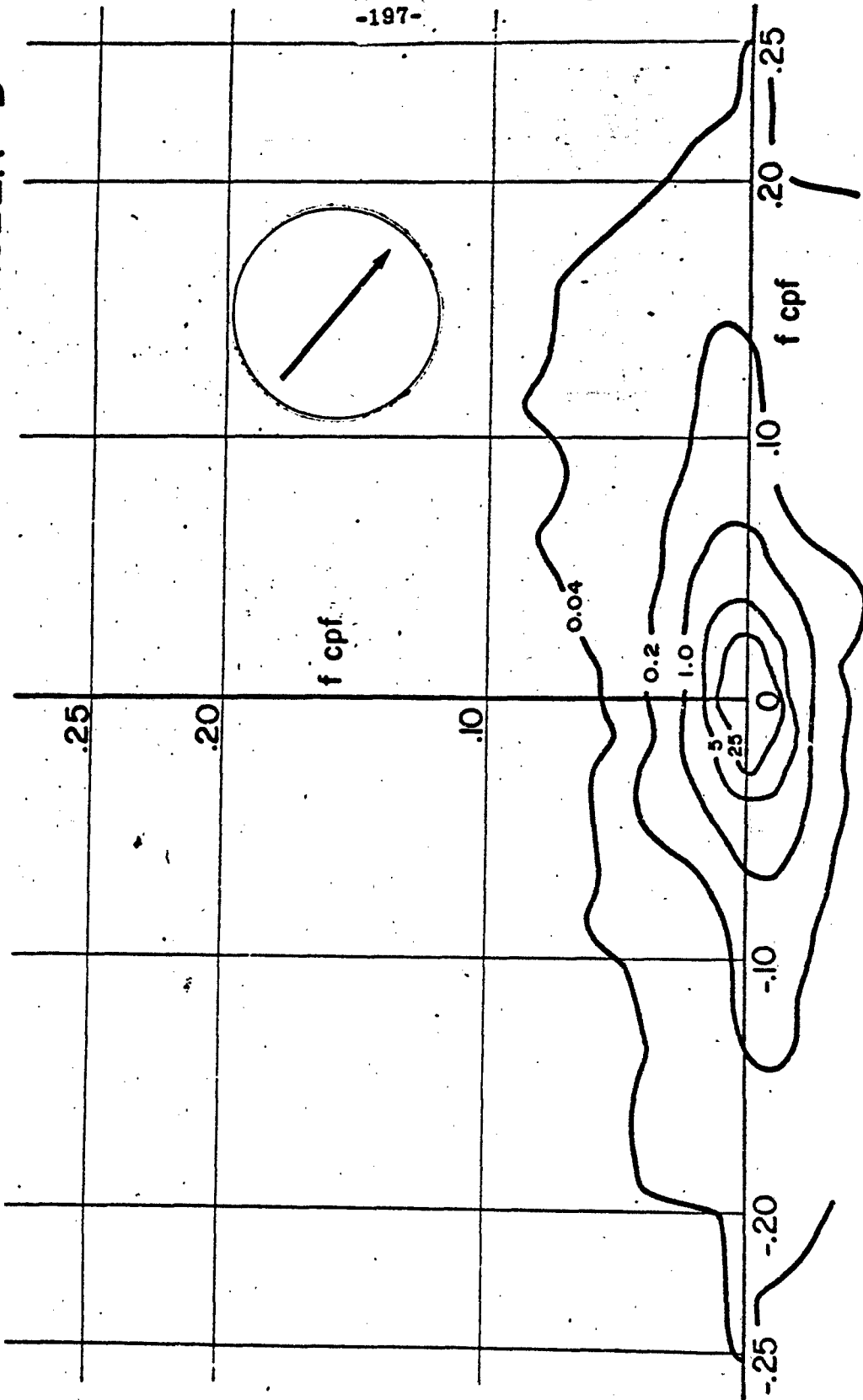
GRUBER C

-196-



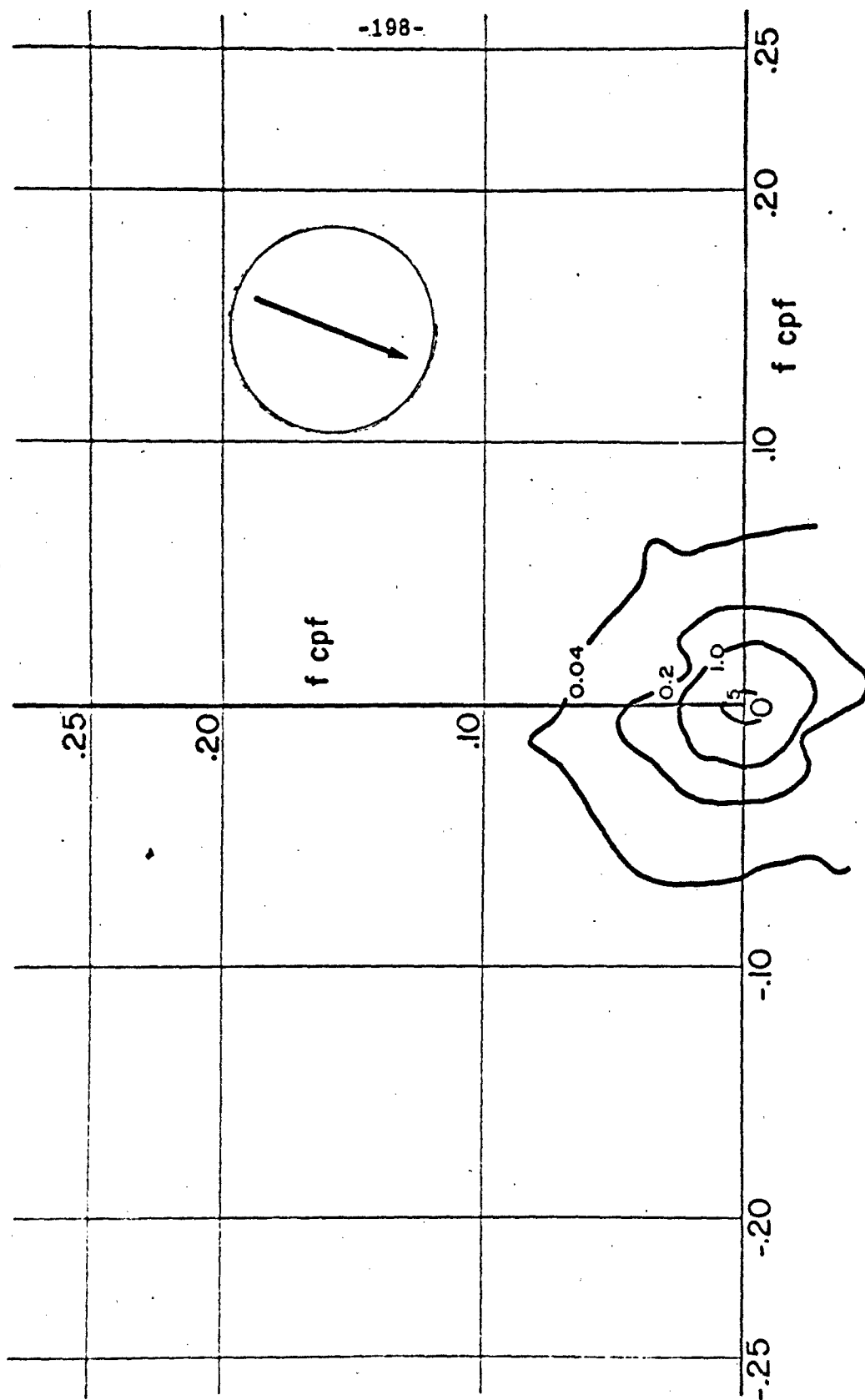
GRUBER D

-197-



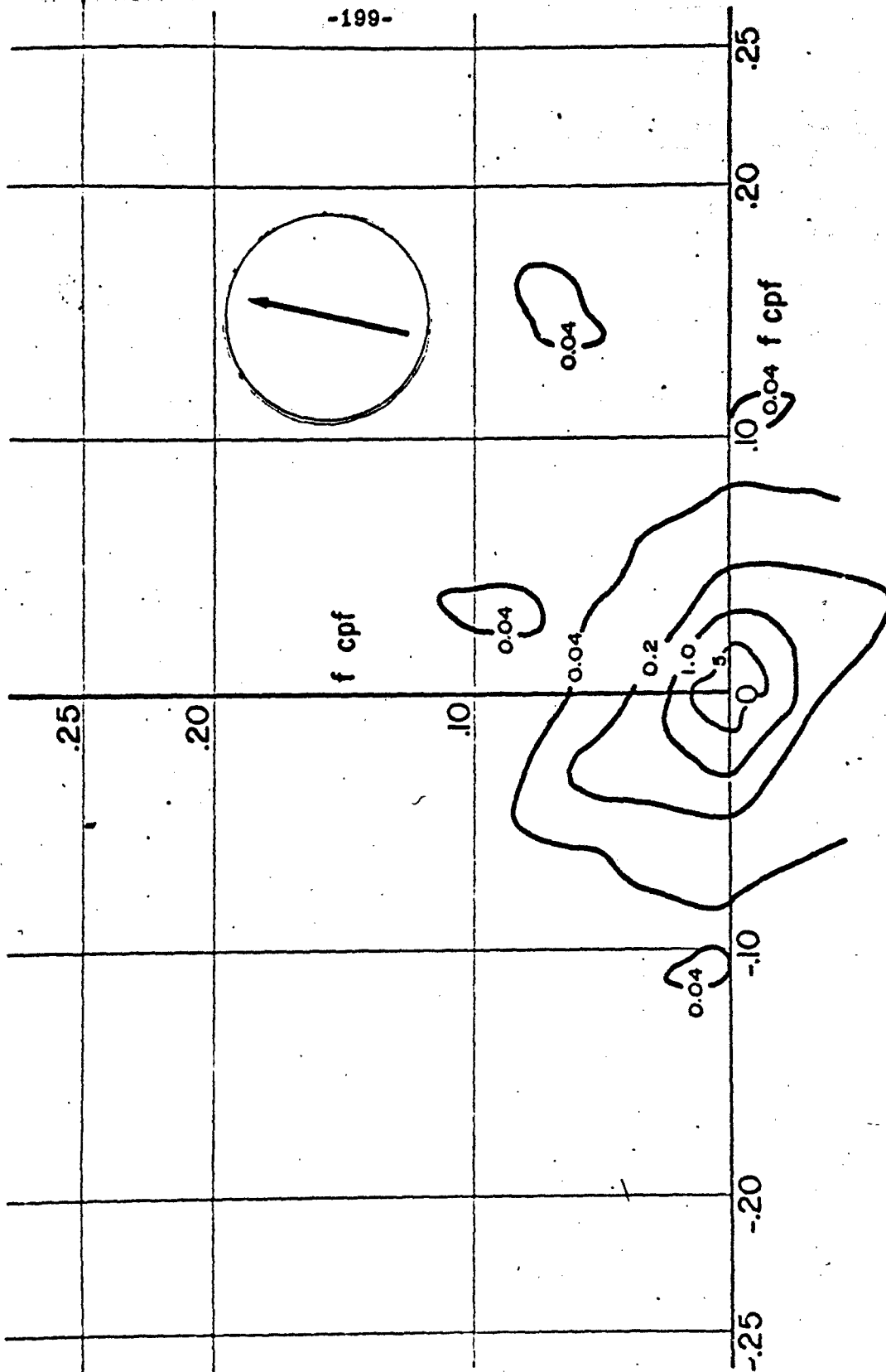
CARSON E

-198-

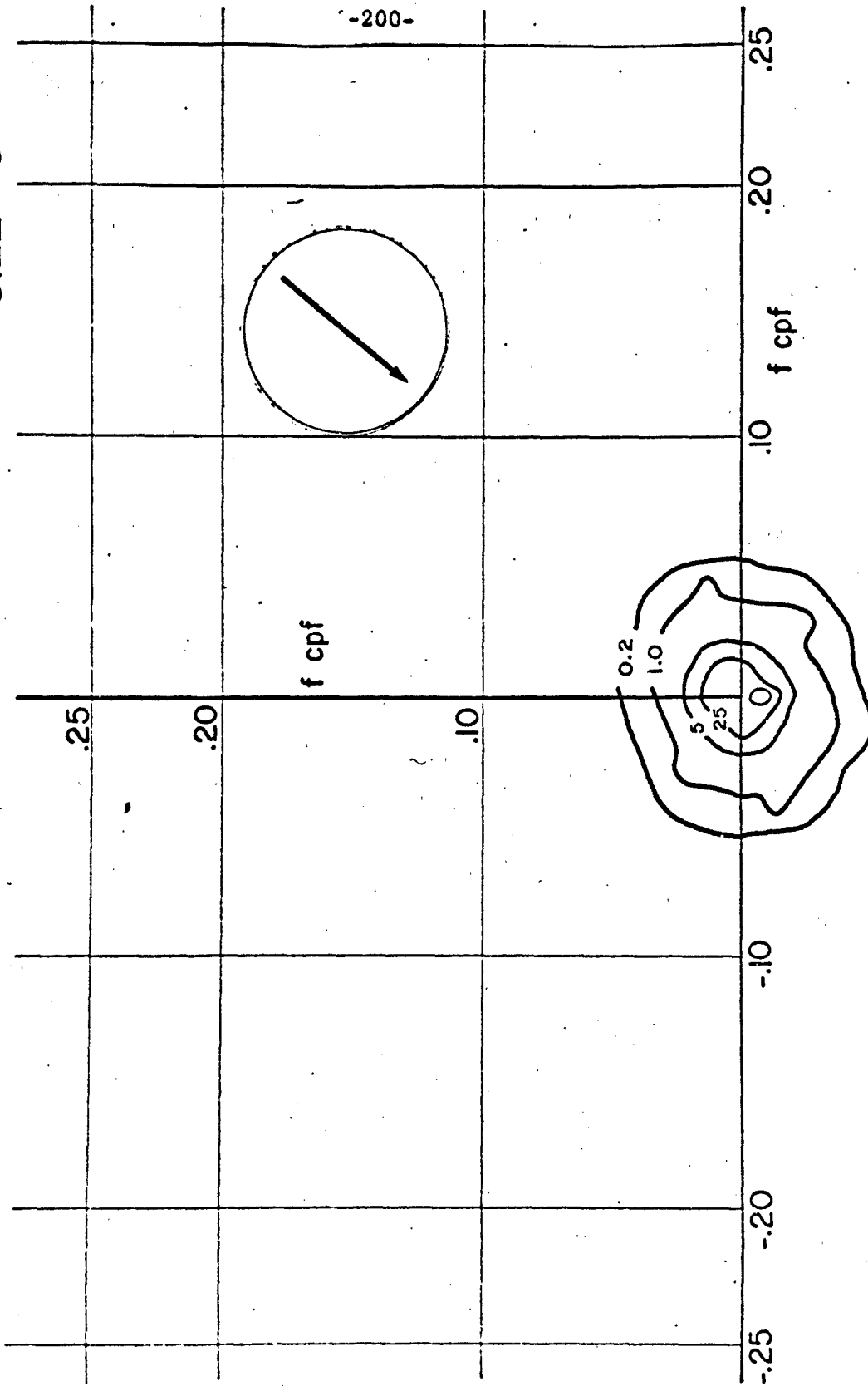


CARSON F

-199-

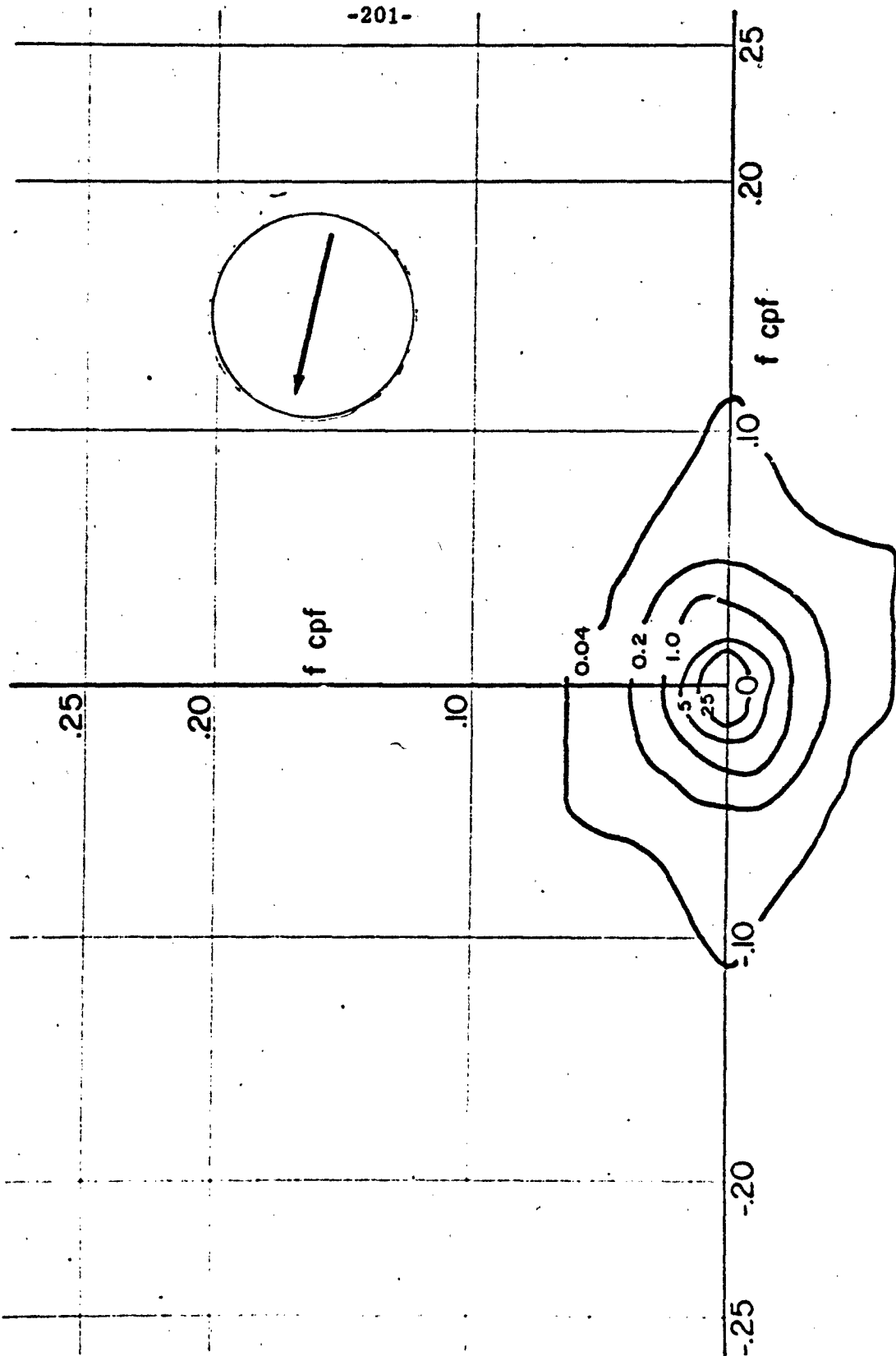


SILL G



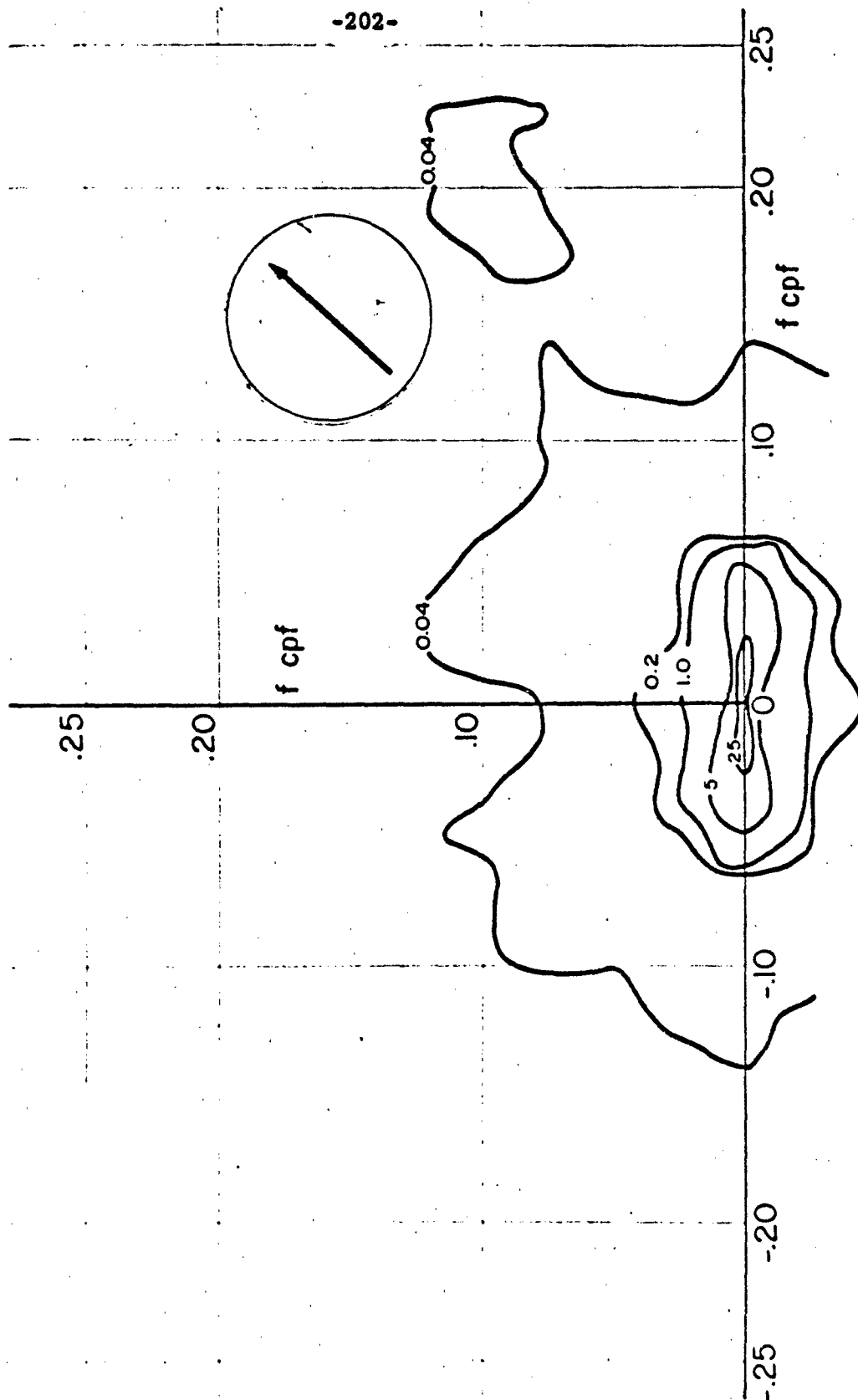
SILL H

-201-



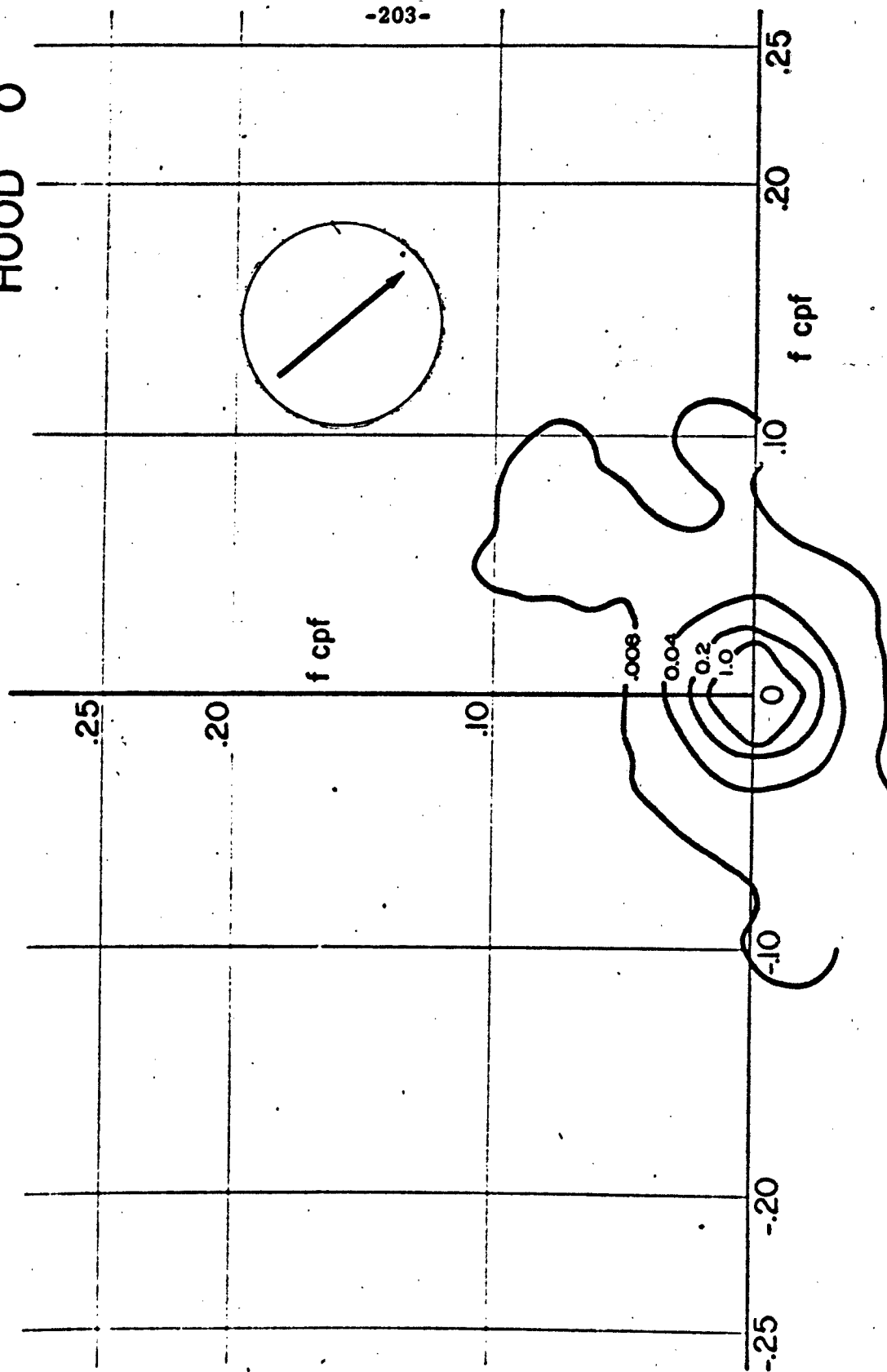
HOOD N

-202-



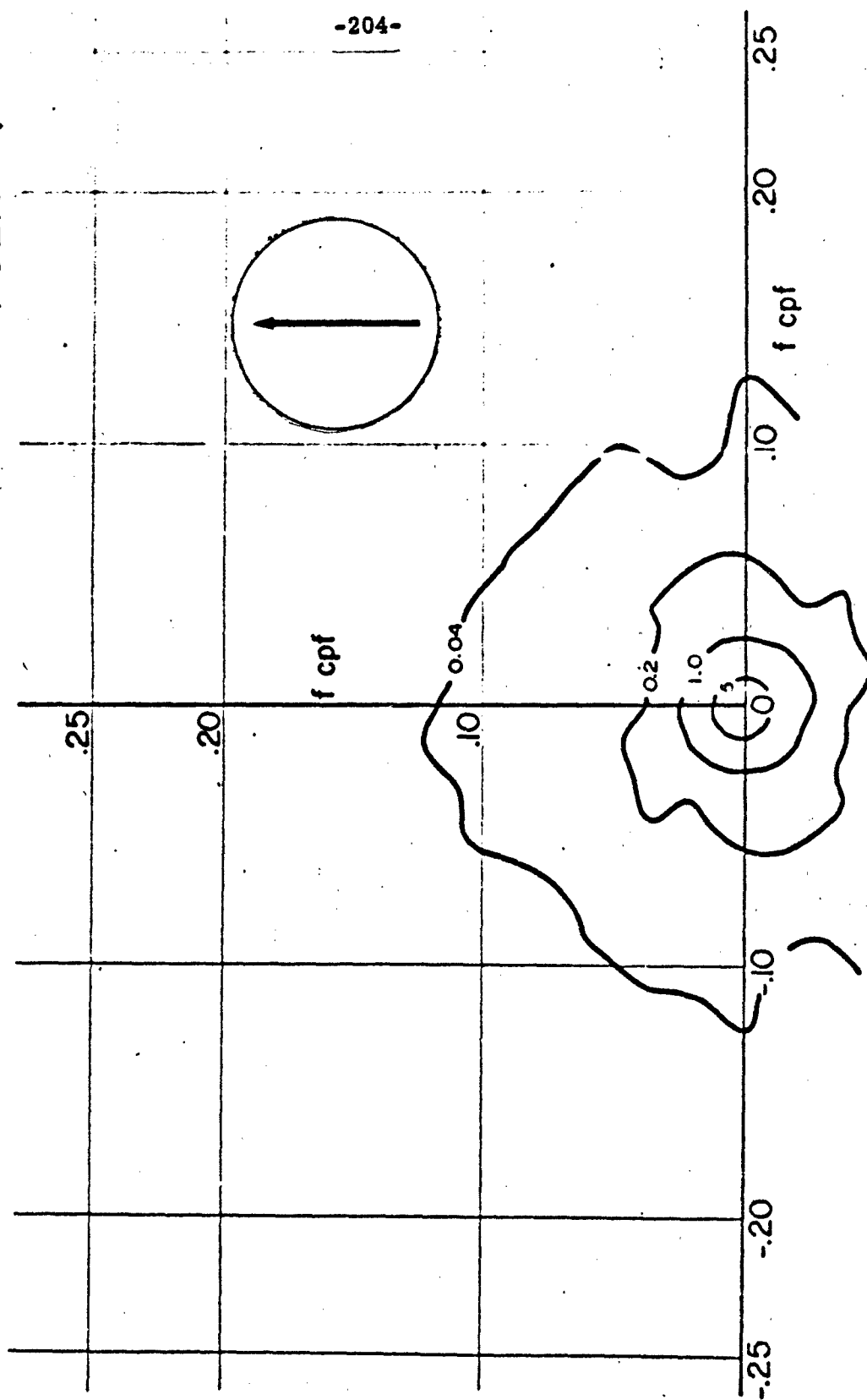
HOOD 0

-203-



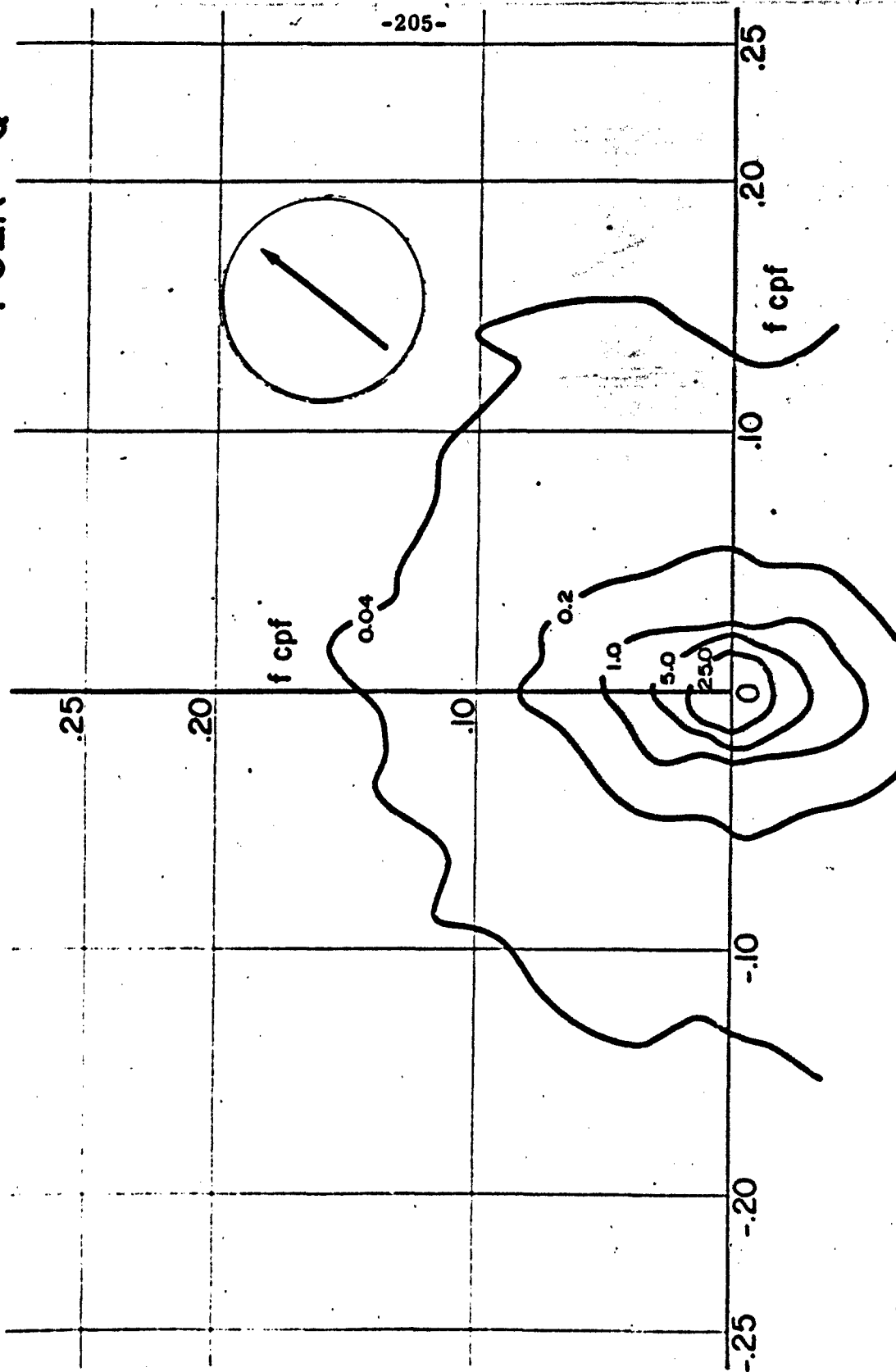
POLK P

-204-



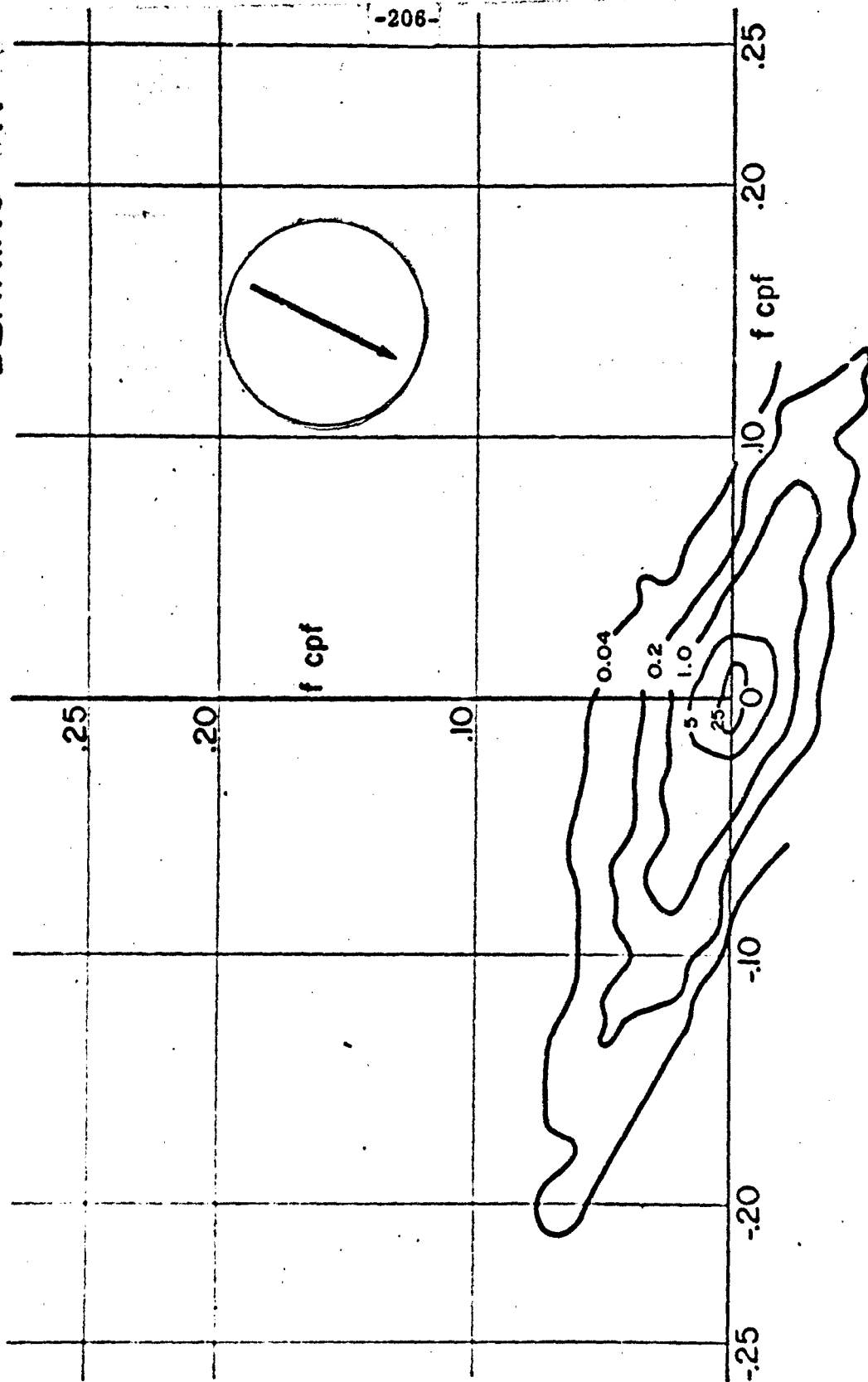
POLK Q

-205-



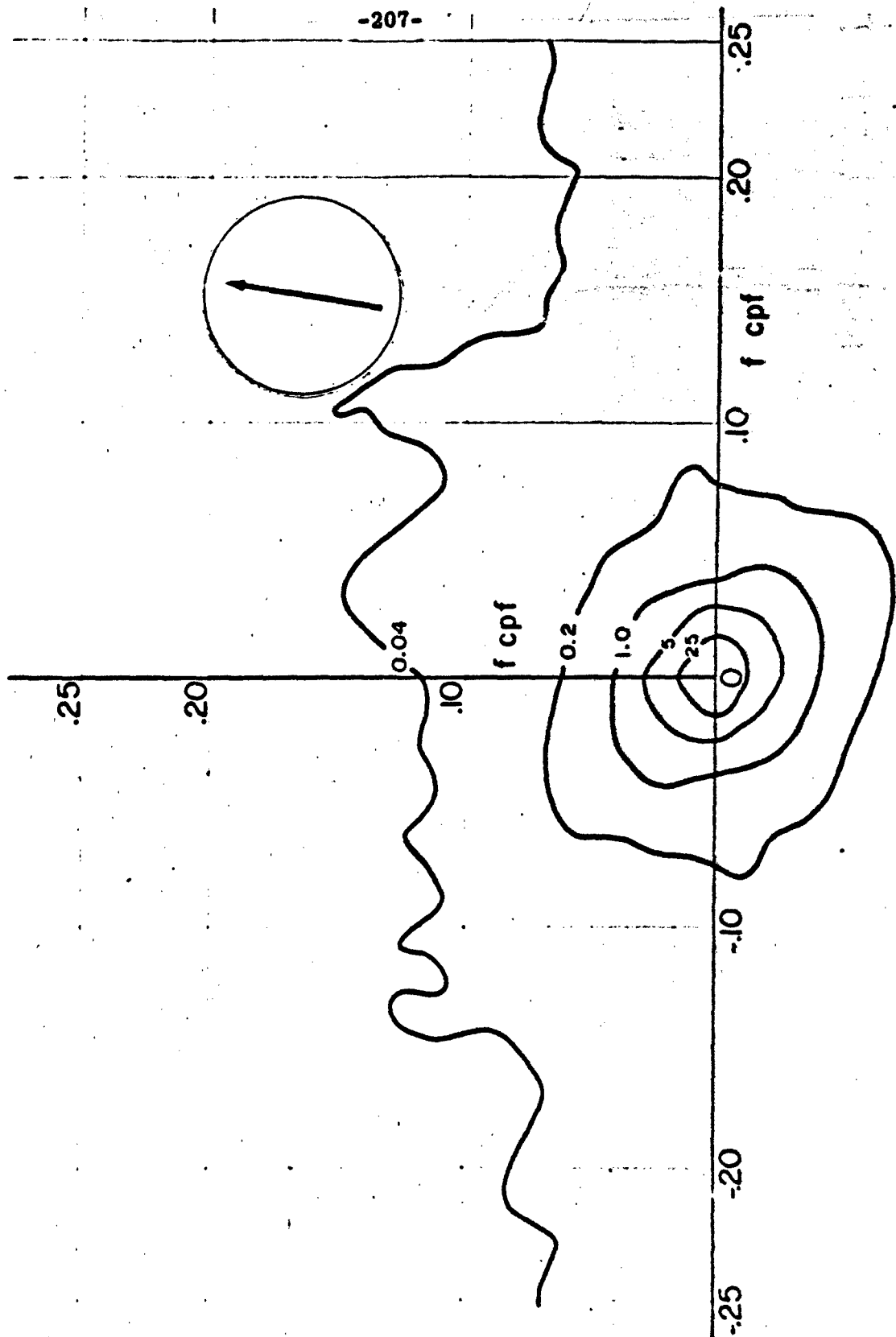
BENNING R

-206-



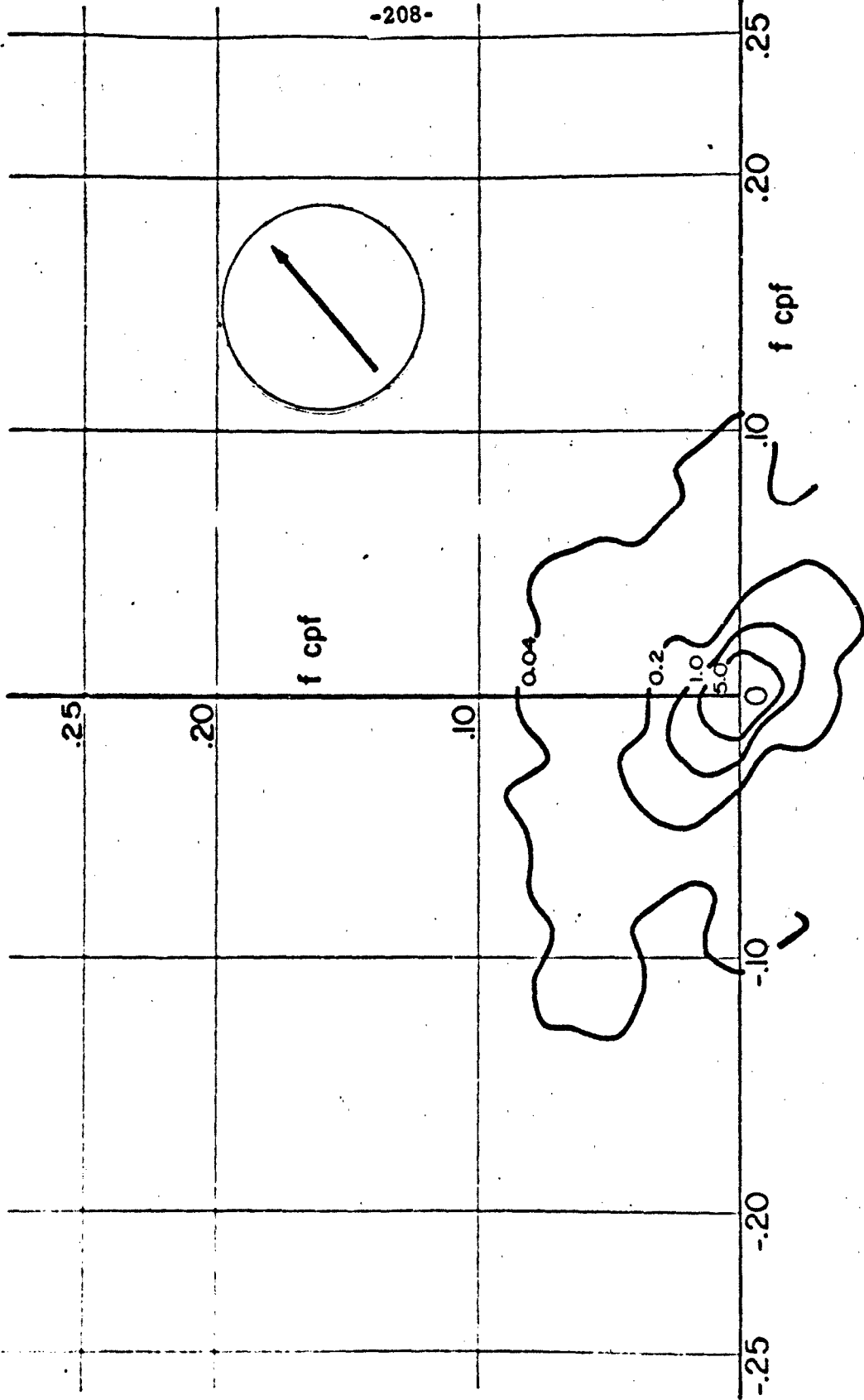
BENNING S

-207-



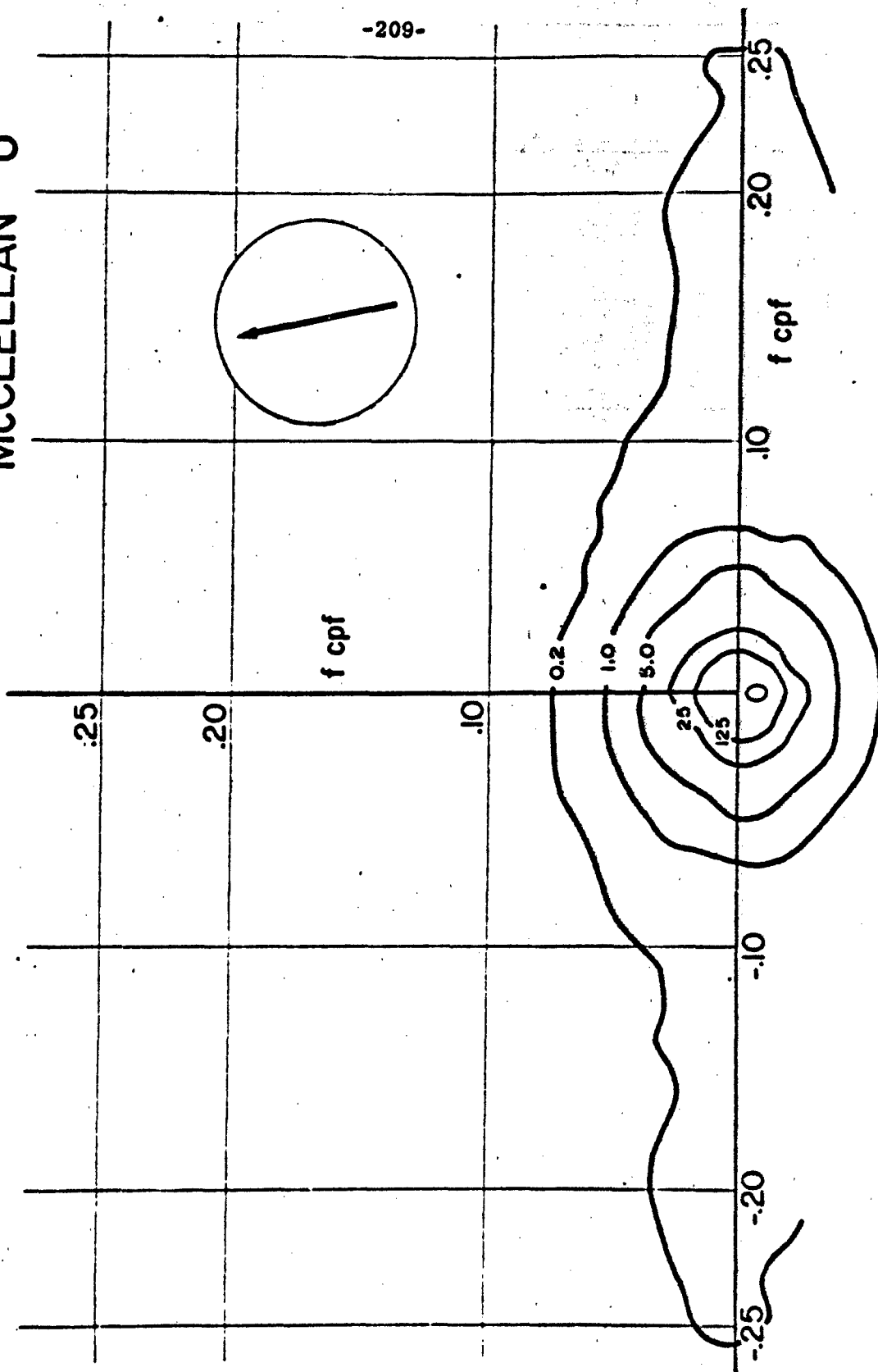
McCLELLAN T

-208-

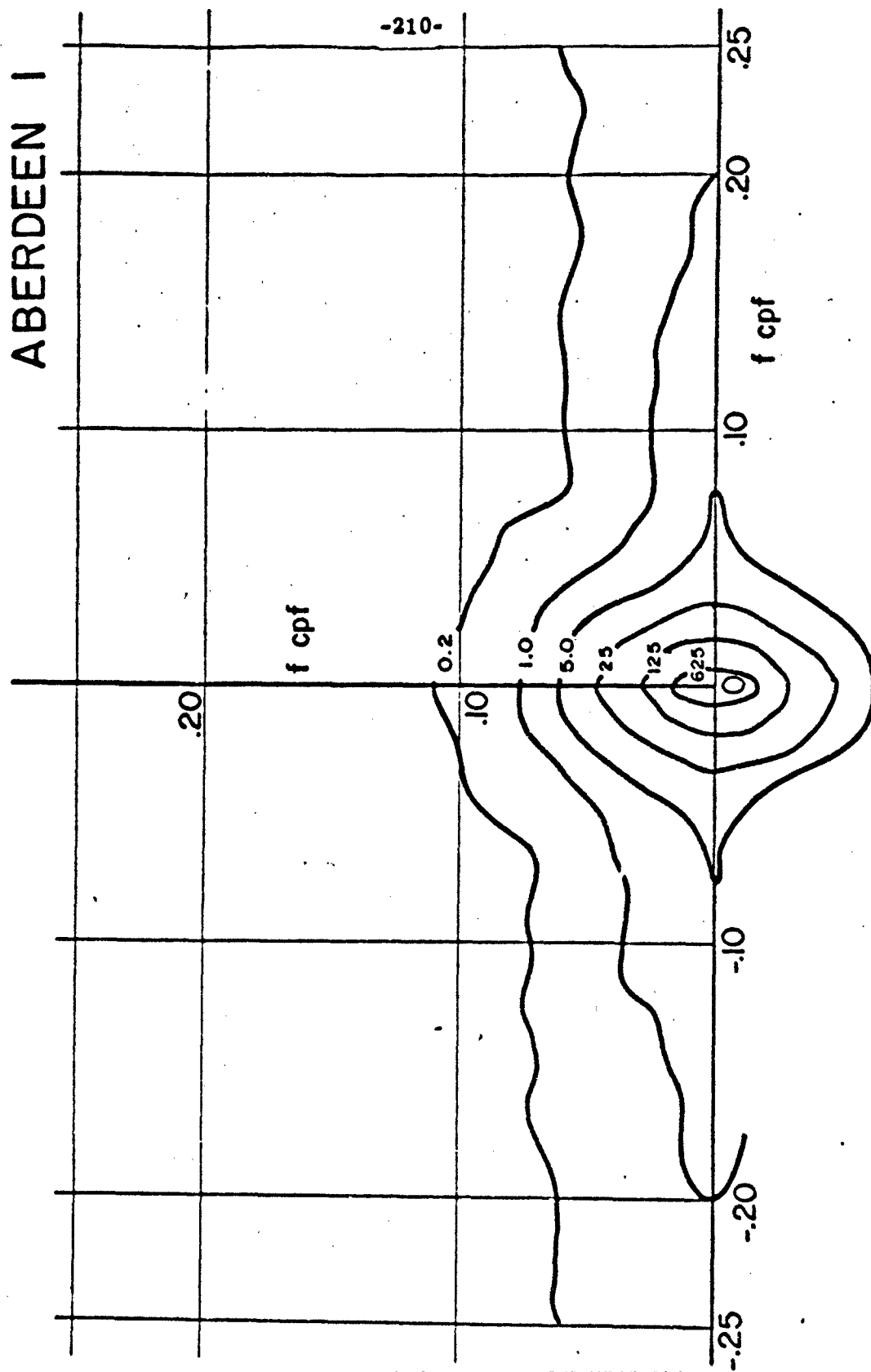


McCLELLAN U

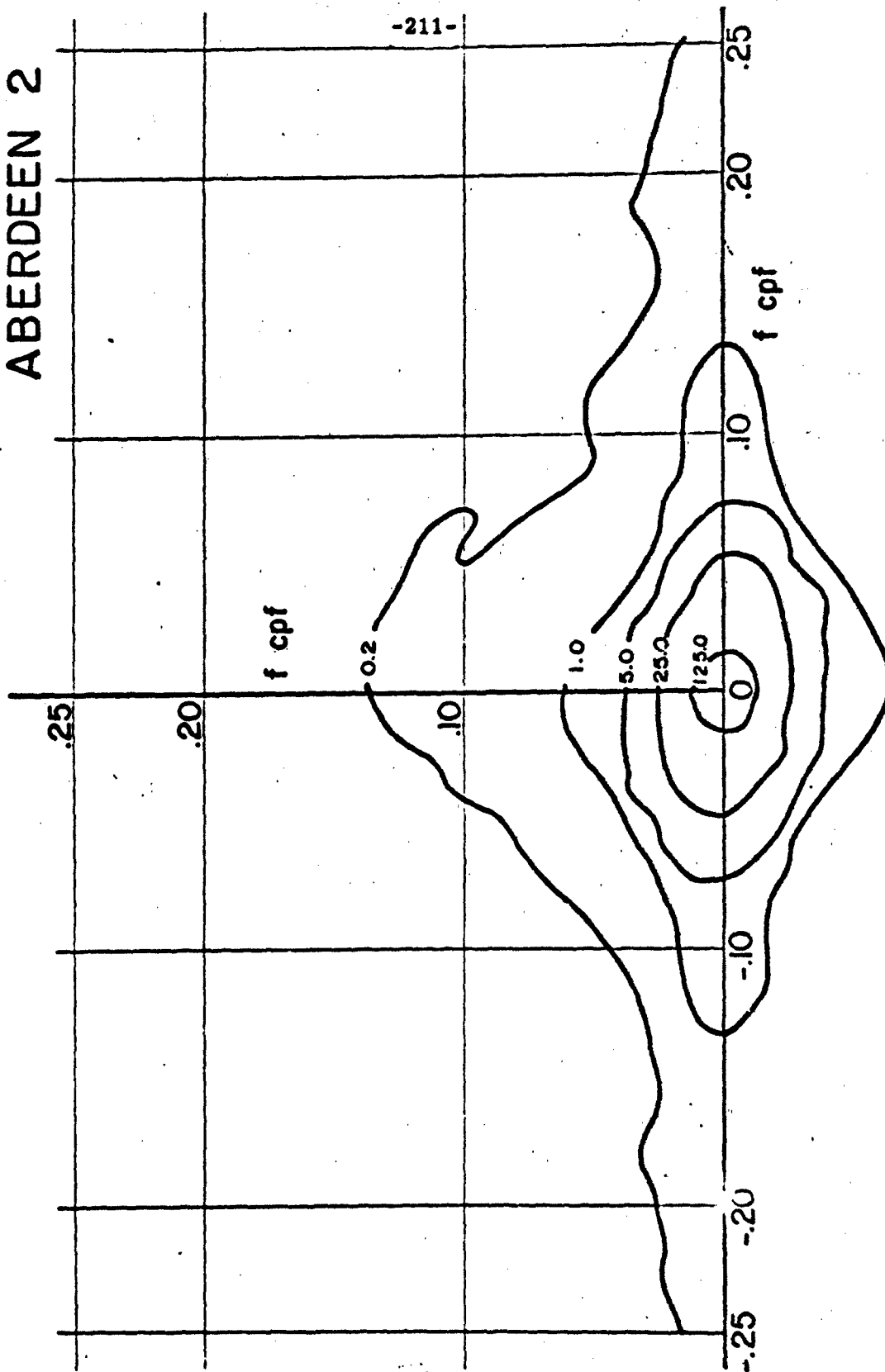
-209-



ABERDEEN I

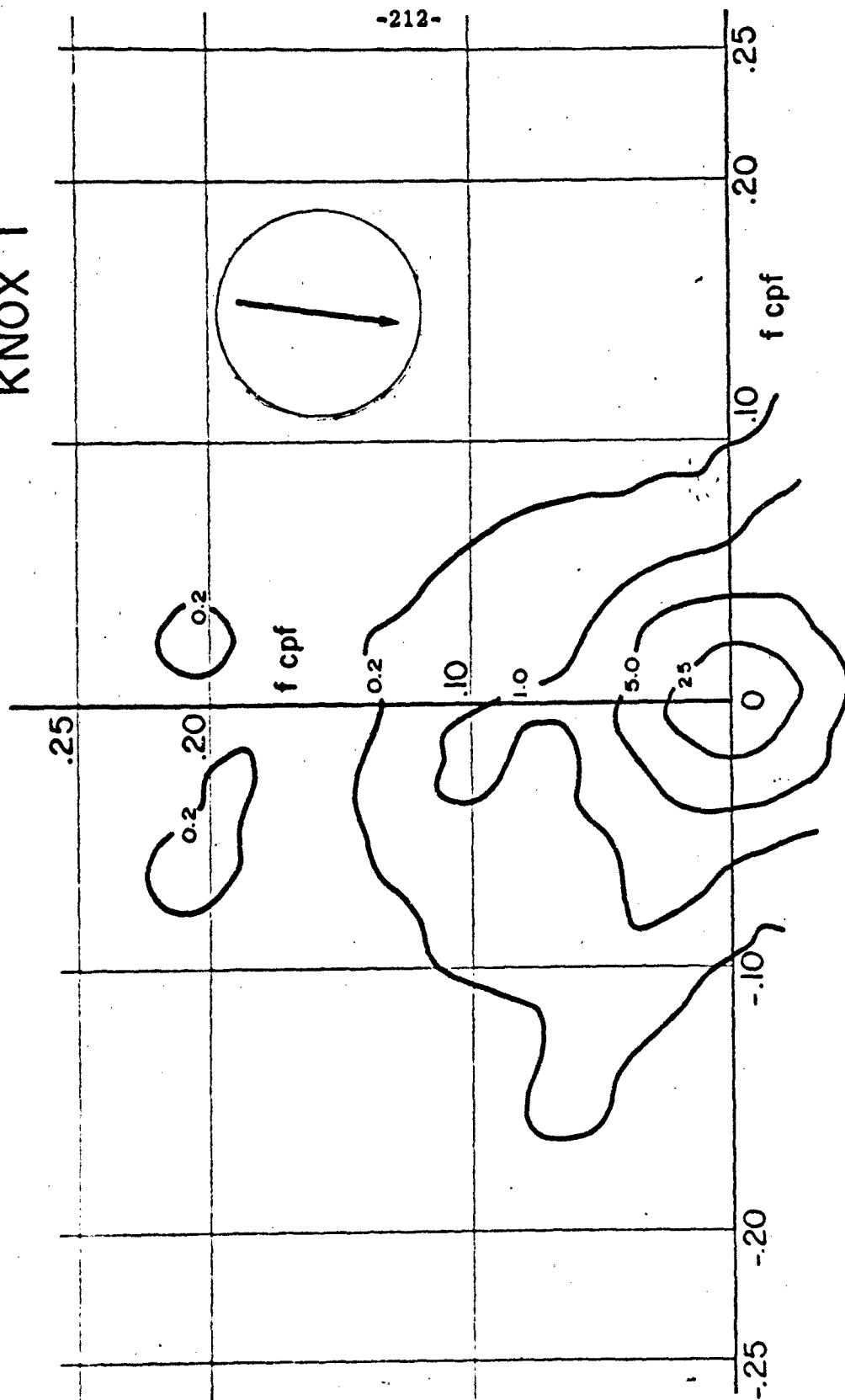


ABERDEEN 2



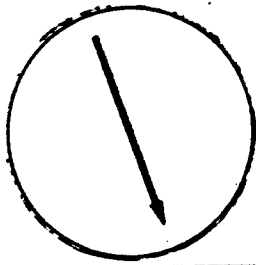
KNOX I

-212-



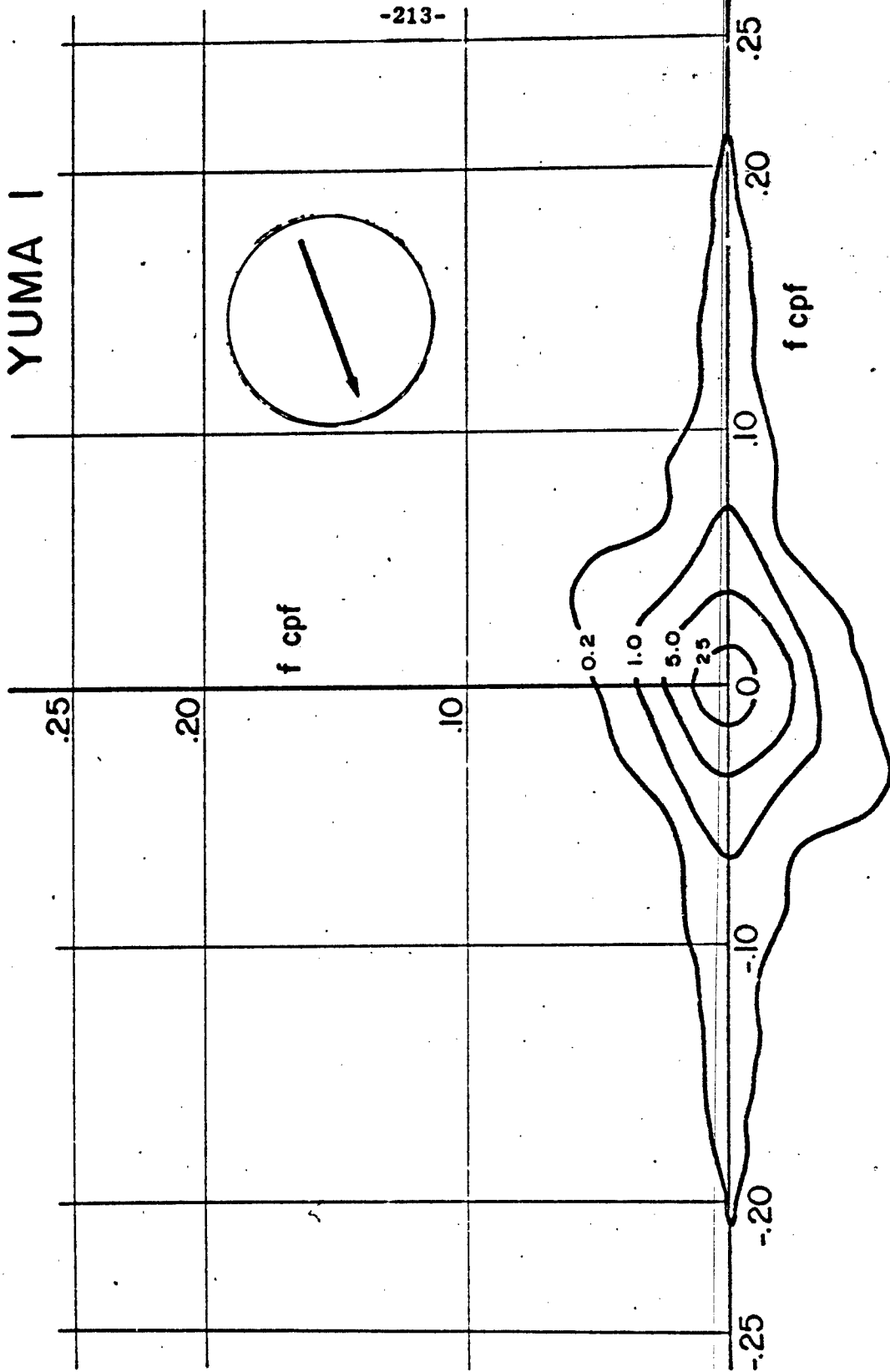
YUMA I

-213-



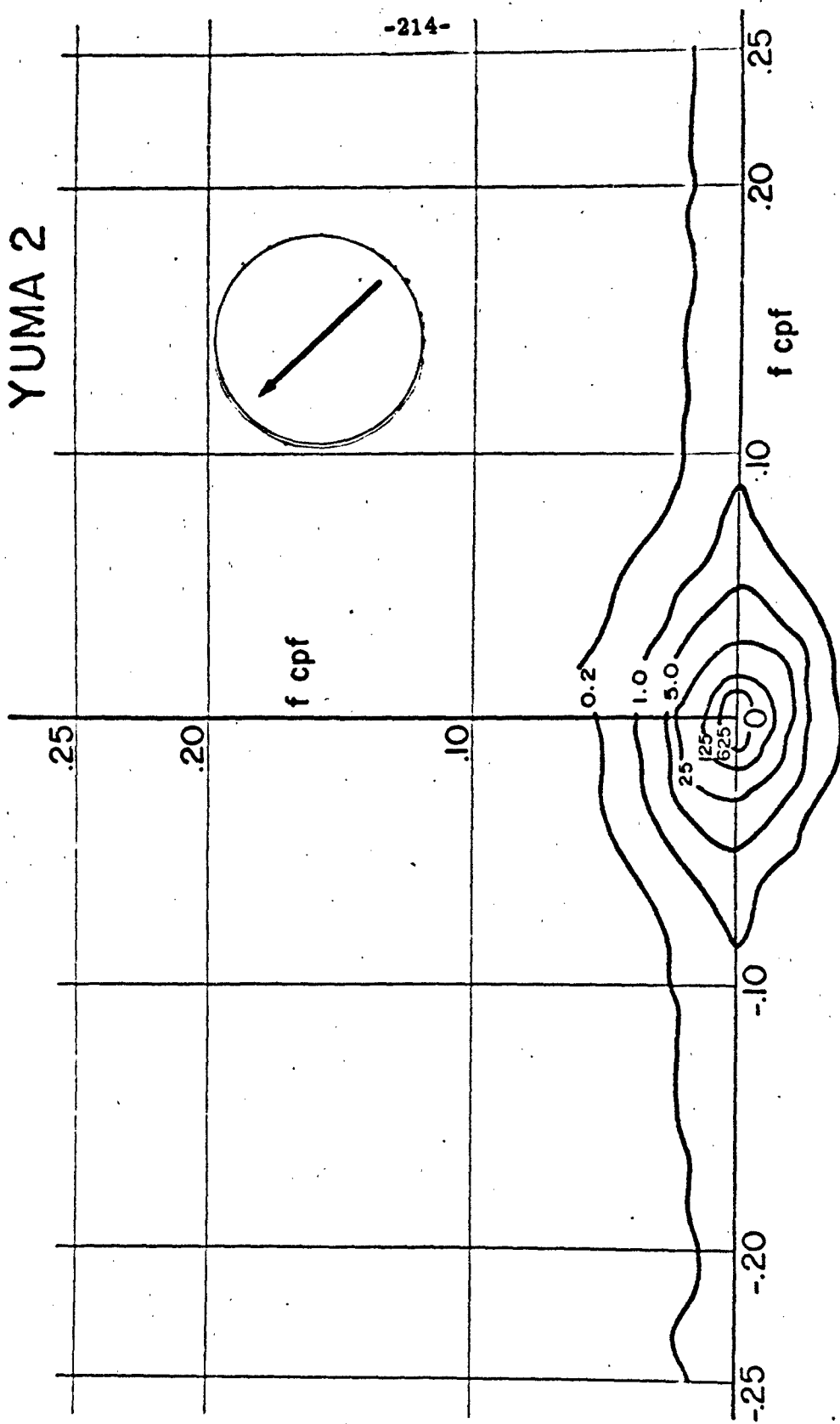
f cpf

f cpf



YUMA 2

-214-



COMPUTATIONS

The computations for this report are done on two programs for the IBM 7094 computer. These programs will be described in considerable detail in Appendices B and C.

In Appendix B, is the co-spectral program for processing data from one track or two parallel tracks. This program was modified from an existing program by adding to it a routine for smoothing the input data and correcting the resulting spectrum. Other changes of a minor nature were also made.

The program described in Appendix C was made especially for processing area data; it is new.

Both programs are available on IBM cards at Midwest Applied Science Corp. at cost.

CONCLUSIONS

There were no surprises in the new line data. Most of the features presented in the p.s.d.'s of our previous report [1] are again to be observed in the new p.s.d.'s. However, the bumps near the 28 ft. wave lengths noticeable in the Knox and Aberdeen p.s.d.'s are not observed again. We conjectured in [1] that these bumps were due to periodic components observable in the ground profile. These could have been caused by repeated use of the ground by vehicles.

The spectra trail off to levels associated with measurement error, as noted in [1]. Thus, power in the high frequency components was generally low. This suggests that a longer measurement interval could have been used. But we are constrained to note that in one vehicle test at Fort Sill high frequency vibration present in the steering system tended to limit speed, indicating that in certain situations closer spacing of data points may be required; this point will be commented upon again in our report on vehicle vibration tests.

Since interpretation is reserved for the second report, we shall now confine attention to conclusions concerning data acquisition and processing.

Surveying methods present a very simple technique for acquiring elevation data. Equipment is easy to rent and use. It is easy to train unskilled personnel in their use for this purpose. The data from Las Vegas were taken in one day by persons who had not previously made this type of measurement.

One is tempted to draw general conclusions from a visual inspection of the data presented. If, however, such remarks are to be meaningful, they must be made keeping in mind the purpose of the study. We cannot, for example, assert that the accuracy of our estimates is good until we know what accuracy is necessary. We cannot make up curves to fit the results unless we know what part of the results must require the closest fit. The internal consistency of the results--the comparison of the line data with the area data at each site, for example--requires some analytic work and perhaps more computation. We will delay such conclusions to the second report.

The spectral estimation procedure was designed with conventional vehicle sizes and speeds in mind. As mentioned elsewhere, it is conceivable that reprocessing of the data may be required for unconventional vehicle types. This point will be studied in due course.

RECOMMENDATIONS

1. For measurement of ground roughness, we recommend that the surveys be conducted with self-leveling levels and self-zeroing rods. Experienced personnel are not required.
2. The format on which the survey data is entered into books is, on the surface, a small matter. However, in recording it on IBM cards for program input, it may be a matter of considerable expense if the original data are not in a suitable format. Recommendations for recording data are presented with the program descriptions in this report.
3. A pre-program must be used to detect outlying data points. The anomalous points must be compared with original books and changed if there is sufficient reason. Unless errors of this type are eliminated, p.s.d. estimates will have peculiar features which are not easily explained. Consultation with survey personnel is usually desirable to check whether outlying values are errors.
4. An extended program to obtain a larger atlas of ground roughness measurements does not seem justified on the basis of the similarity between the results already obtained. Specific experiments or vehicle trials may, however, require surveys.
5. We recommend this atlas be used by those interested in aspects of ground roughness which can be measured by p.s.d.'s. These p.s.d.'s are from many different areas. They may be combined into an average for some purposes or their differences may be noted. In any case, a quantitative use of these results awaits further development.

REVIEWED: 

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APPROVED: 

KEITH G. COMSTOCK
Lt Col, Ord
Chief, Components R&D Laboratories

REFERENCES

- [1] Report 8391 LL95 of the Land Locomotion Laboratory, U. S. Army Tank-Automotive Center, Warren, Michigan. "Statistical Studies of Stable Ground Roughness" by Frank Kozin, Louis J. Cote, and John L. Bogdanoff (Nov. 1963).
- [2] "Introduction to a Statistical Theory of Land Locomotion", by John L. Bogdanoff, Frank Kozin, and Louis J. Cote, in four parts. Jour. Terramechanics, Vol. 2, 3 (1965, 1966).

APPENDIX A

List of Equipment Used by Surveying Crew

1 dozen	Blue Crayons
2 lb.	Stake Tacks
2 rolls	Red Plastic Tape
2 rolls	Orange Plastic Tape
1 dozen	Pencils
2	Surveyor's Bags
4	100 ft. Engineer Tapes (Post Cat. No. 3141H)
2	100 ft. Lufkin 3/8" Steel Tapes (Post Cat. No. 3245K)
2	100 ft. Cloth Tapes (Post Cat. No. 3200K)
6	Range Poles
8 sets	14 in. Marking Pins
8	Marking Pin Rings
4	8 oz. Plumb Bobs
4	Plumb Bob Sheaths
2 skeins	Plumb Bob Cord
30 sets	Level Book Leaves
1 set	Cross Section Leaves
5	Binders
1	Prismatic Compass
2	Lenker Elevation Leveling Rods
2	Repeating Theodolites K&E Cat. No. 730050
2	Zeiss Self Leveling Levels K&E Cat. No. 750020
1	Auto Top Carrier and Cover
2	Shovels
2	Machettes
2	Thermos Jugs
2	Folding Stools
2	Canvas Bags
1	Hatchet
2	Snake Bite Kits
1	Auto First Aid Kit
1	Camera
1	Station Wagon
	Surveying Stakes and other expendible items purchased in field.

APPENDIX B

Linear Power Spectral Density Program

'PSLINE'

1. Purpose: 'PSLINE' is designed to accept one or more sets of data, each of which consists of one to five parallel tracks. The tracks are represented by as many as one thousand, equally spaced points. Control parameters have been provided to allow flexibility in specifying filtering values, output requirements and track selection.

'PSLINE' provides the basic operation of computing the covariance functions, raw spectra and spectral estimates for one track or a pair of tracks.

2. Machine Requirements: The 'PSLINE' program exists as a (IBM) FORTRAN IV source program consisting of several subroutines. It is intended to be run on the IBM 7094 computer under the IBSYS operating system. Deviation from these conditions may involve slight modification of the source program. (See Supplement 1 for detailed description of program logic.)

3. Card Preparation:

CONTROL CARD

COLS	1 - 6	\$LINEP
	7 - 8	Input tape number.
		05, blank - all input is taken from tape 05.
		XX - TITLE card, track data only are taken from tape XX, other information from tape 05.
	9	X - number of tracks.
		$1 \leq X \leq 5$
	10 - 12	XXX - number of lags.
	13	1
	14 - 15	XX - Number of filtering coefficients.
		$1 \leq XX \leq 20$

- B-2 -

16 - 21	XXXXXX - distance between points within a track. Decimal point must be punched.
22	0, blank - do not print raw data. 1 - do print raw data.
23	0, blank - do not print smoothed data 1 - do print smoothed data.
24 - 25	XX - number of selection cards.
26 - 80	Blank

SELECTION CARDS

Type 1:

COLS	1 - 7	\$SELECT
	8	0 - Print covariance functions 1 - Do not print.
	9	0 - Print raw spectrum. 1 - Do not print.
	10	0 - Print spectral estimates. 1 - Do not print.
11 - 16		bbbbY - Track No. 1
17 - 22		bbbbb, bbbby - Track No. 2

In both cases, if Y is present
 $1 \leq Y \leq X$, where X is the digit in Col. 9 of the CONTROL card.

If Track No. 2 is present, then the pair of tracks (No. 2 and No. 1) will be processed.

If Track No. 2 is not present, then only the single track specified by Track No. 1 will be processed.

Type 2:

COLS	1 - 7	\$SELALP
	8,9,10	As in Type 1.

All possible pairs of tracks are processed.

Type 3:

COLS 1 - 7 \$SELALS
8,9,10 As in Type 1.

All tracks are processed individually.

KEY CARD

COLS 1 - 72 Blank
73 - 80 An eight digit number which appears
on the TITLE card of the partic-
ular track data which is to be
processed.

This card is present to allow processing of arbitrarily positioned data sets on a tape other than Tape 5. However, regardless of whether the track data is on Tape 5 or on another tape, the KEY card number and the TITLE card number for the track data must be present. If more than one set of track data is to be processed, the sets must be in the same order as the KEY cards are encountered, i.e., PSLINE will not rewind the input tape if the correct TITLE card has not encountered when the end of the tape is reached.

TITLE CARD

COLS 1 - 6 Blank
7 - 36 Any text which identified this
track data set. This title will
appear at the top of each page
of output for this track data
set.
37 - 72 Blank
73 - 80 Eight digit number which will
identify this track data set
given the number on the KEY
card.

TRACK DATA

A set of track data consists of 1 or more tracks, all of which consist of the same number of points. Let $T(I,J)$ denote the I th point of the J th track. Suppose there are n tracks, then

- B-4 -

$T(I,1), T(I,2), \dots T(I,n)$ is called the I th cross-section for this set of track data. Track data is punched into cards by cross-sections and is read by 'PSLINE' by cross-sections. A FORMAT card must be constructed to indicate how the cross-section values have been punched on cards. In addition the FORMAT card must allow for a one character, alphameric field to be read after the last number of each cross-section. The use of this character will be discussed later.

Example Track 1 4.0, 4.2, 4.3
 Track 2 3.1, 3.2, 3.3

This could be punched as follows:

Card 1	COLS 1-3	4.0
	4-6	3.1
Card 2	COLS 1-3	4.2
	4-6	3.2
Card 3	COLS 1-3	4.3
	4-6	3.3
Card 4	COLS 1-3	Blank
	4-6	Blank
	7	* or \$ or /

And the associated FORMAT card would be

(2F3.0, A1)

NOTE: Columns 73-80 should not be used to contain track data or the one character field.

TERMINATION CARDS

In order to eliminate the necessity of counting the number of points/track in a track data set, PSLINE looks for a special cross-section in which the one-character field is not blank and is one of *, \$ or /. When a cross-section of this type is found the following actions are taken:

1. The numeric values read are NOT included in the true track data.
2. It is assumed that the last cross-section read is the last cross-section for this track data set.
3. The particular character (*, \$, or /) found determines how the NEXT input set is to be processed:
 - * indicates that there are no more input sets.
 - / indicates that the next input set consists of only
 - KEY card
 - TITLE card
 - Track Data (including TERMINATION card)

This allows one to process many track data sets with the parameters found on one CONTROL card. Note that this presupposes that filtering specifications, number of tracks, number of SELECTION cards and track data format are identical for the next data set.

- \$ indicates that a new control card is to be read with the next input set. I.e., the next input set will consist of

- CONTROL Card
- Filtering Coefficient Format Card
- Filtering Coefficients
- Track Data Format Card
- KEY Card
- TITLE Card

Track Data (including TERM-
INATION Card)
SELECTION Card(s)

FORMAT CARD

The variable format technique is employed by PSLINE to allow flexible data card format. A FORMAT card for PSLINE consists of a standard FORTRAN FORMAT statement, with the word FORMAT deleted, punched free form, into columns 1-72 of a card.

Filtering coefficient format must contain only F or E-type conversions, track data formats must specify one more field than the number of tracks with the last of the fields A1.

Consult IBM FORTRAN IV programming (7090/94) manuals for detailed description of FORMAT statements.

4. Deck Preparation: The following is an example of a deck prepared using the various termination character options. Bracketed cards would appear on another tape (other than the system input tape) if the CONTROL card specified so.

\$JOB card
Installation \$ID card
\$EXECUTE IBJOB
\$IBJOB
Source Program Deck
or
Binary Object Deck
\$DATA card
CONTROL card
Filtering Coefficient FORMAT Card
Filtering Coefficients
Track Data FORMAT Card
KEY Card
TITLE Card
Track Data (TERMINATION Card with /)

- B-7 -

SELECTION Card(s)
KEY Card
Track Data (TERMINATION Card with \$)
SELECTION Card(s)
CONTROL Card
Filtering Coefficient FORMAT Card
Filtering Coefficient
Track Data FORMAT Card
KEY Card
TITLE Card
Track Data (TERMINATION Card with *)
SELECTION Card(s)
END-OF-FILE Card

SUPPLEMENT 1

to

LINEAR POWER SPECTRAL DENSITY PROGRAM

A. General Program Logic

The PSLINE program consists of a main program (deck name RVR...) and five subroutines (entry points - INPUT, OUTPUT, FILDEC, COQUAD, and CORRET).

1. INPUT - The INPUT subroutine reads all input cards except selection cards and sets parameters to control the processing of the track data. Upon reading the filtering coefficients, it calls subroutine CORRET to compute the actual filtering values.
2. OUTPUT - The OUTPUT subroutine is called by the main program, RVR..., to print out raw and/or smoothed track data, one track per call.
3. FILDEC - The FILDEC subroutine is called by the main program, RVR..., to perform the filter transformation on the track data.
4. CORRET - The CORRET subroutine is called by the INPUT routine to compute the actual filtering values from the filtering coefficients read from cards.
5. COQUAD - The COQUAD subroutine is called by the main program, RVR..., and is supplied with two tracks as arguments. It does all computation for the spectral analysis of the filtered track data and all associated output (covariances, raw and smoothed spectra).
6. RVR... - The main program, RVR..., calls INPUT, OUTPUT, and FILDEC to prepare the filtered track data. It then reads SELECTION cards and calls COQUAD to perform the required spectral analysis.

B. Internal Data Organization

The following is a list of the various blocks of labeled COMMON and their associated variables. The table which follows indicates (via an X) which blocks are available to each routine.

Block Name

DLABEL

NDMT - Number of filtering coefficients.
D(20) - Filtering coefficients.
RAW - Switch (true or false) to control printing of raw data.
SMOOTH - Switch (true or false) to control printing of smoothed data.
NSEL - Number of SELECTION cards to be read.

DELTAX

DELTA - Distance between track points.
LAGS - Number of lags specified on CONTROL card.

LABEL

NAME(5) - COLS. 7-36 of TITLE card.

XXX

LA(501) - Actual filtering coefficients computed by CORRET and used by COQUAD.

LIST

IC - Switch (0 or 1) to control printing of covariance functions.
IR - Same as IC for raw spectrum.
IS - Same as IC for spectral estimates.
ITWO - Switch (true or false) set by RVR... to tell.

QSQ

CS(1002) - Computational constants produced
QA(501) - by CORRET for use in COQUAD.

	DLABEL	DELTAX	LABEL	XXX	LIST	QSQ
RVR...	X				X	
INPUT	X	X	X	X		
OUTER			X			
CORRET	X	X		X		X
FILDEC	X					
COQUAD		X	X	X	X	X

C. Detailed Description of Routines

Subroutine OUTER

ARGUMENTS:

ARRAY - Floating Pt. vector.
N - Number of elements in ARRAY.
XN - Track Code: Track No. 1-A,
Track No. 2-B, ..., Track No. S-E.
KK - 1 if raw track.
2 if smoothed track.

OPERATION:

Outputs ARRAY, ten numbers per line, with a double space every ten lines and a new page every fifty lines. Each page is headed by the information in Columns 7-37 of the TITLE card and the appropriate track code.

Subroutine CORRET

PARAMETERS: (Passed via labeled COMMON)

LAGS - Number of lags.
NF - Number of filtering coefficients.

- B-11 -

FACTOR(NF) - Filtering coefficients.

OPERATION:

Computes the following:

For $i = 1, 2, \dots, NF$

$$QA_i = \sum_{j=1}^{NF-i+1} FACTOR_j \times FACTOR_{j+i-1}$$

For $i = 1, 2, \dots, 2 \times LAGS$

$$CS_i = \cos \left[(i-1) \times \frac{\pi}{LAGS} \right]$$

$$LA_i = QA_i + 2 \times \sum_{j=2}^{NF} QA_j$$

For $i = 2, 3, \dots, LAGS + 1$

$$LA_i = QA_i + 2 \times \sum_{j=2}^{NF} PA_j \times CS_{[(i-1) \times (j-1) \text{ Modulo } 2 \times LAGS] + 1}$$

Subroutine FILDEC:

ARGUMENTS:

- A - ARRAY containing raw track data.
- NA - Number of points of raw track data.
- NB - Set by FILDEC, number of points in smoothed track data.

OPERATION:

Smooths the track data in A and returns smoothed track data to A.

PARAMETERS: (Via labeled COMMON)

P - ARRAY of filtering coefficients.
NF - Number of filtering coefficients.

For $i = 1, 2, \dots, NA - NF + 1$

$$A_i = \sum_{k=1}^{NF} P_k \times A_{i+k-1}$$

NB is set to $NA - NF + 1$

Subroutine INPUT:

ARGUMENTS:

A - A five column ARRAY with 1050 rows into which track data will be read.
I - INPUT will set this to number of points per track in the data read.
J - INPUT will set this to the number of tracks read.

Main Program RVR...

VARIABLES:

A - ARRAY of track data passed from INPUT routine.
NDATA - Number of points per track.
J - Number of tracks.

OPERATION:

See flow chart.

Subroutine COQUAD:

This was originally a routine for computing spectra, co-spectra and other related quantities. It was obtained from the University of California, Berkely, California. Its identification is G2 BC COQD. The program was written by Steward W. Smith, California Institute of Technology Seismological Laboratory, and was modified for BC Computer Center by Emily Harris in February 1963.

A flow chart for this program is not available and operating instructions are contained largely in the above. We present those quantities calculated by the program which are used by us.

The following two terms are computed for $p=0$ to m .

$$(\text{TERM } 1)_p = \sum_{i=1}^{N-p} x_i y_{i+p} - \frac{1}{N-p} \sum_{i=1}^{N-p} y_{i+p} \sum_{i=1}^{N-p} x_i$$

$$(\text{TERM } 2)_p = \sum_{i=1}^{N-p} y_i x_{i+p} - \frac{1}{N-p} \sum_{i=1}^{N-p} x_{i+p} \sum_{i=1}^{N-p} y_i$$

The following covariance estimates are computed for $p=0$ to m .

$$(\text{QX})_p = \frac{1}{N-p} \times \text{formula for TERM 1 with } x \text{ replacing } y \text{ so that products involve } x\text{'s only.}$$

$$(\text{QY})_p = \frac{1}{N-p} \times \text{formula for TERM 1 with } y \text{ replacing } x \text{ so that products involve } y\text{'s only.}$$

$$(\text{QC})_p = \frac{1}{2(N-p)} [(\text{TERM } 1)_p + (\text{TERM } 2)_p]$$

$$(QQ)_p = \frac{1}{2(N-p)} [(TERM 1)_p - (TERM 2)_p]$$

The raw spectral estimates are denoted (LZ) where Z may be X, Y, or C. (LQ) is computed by a separate formula. These are computed for $h = 0$ to m .

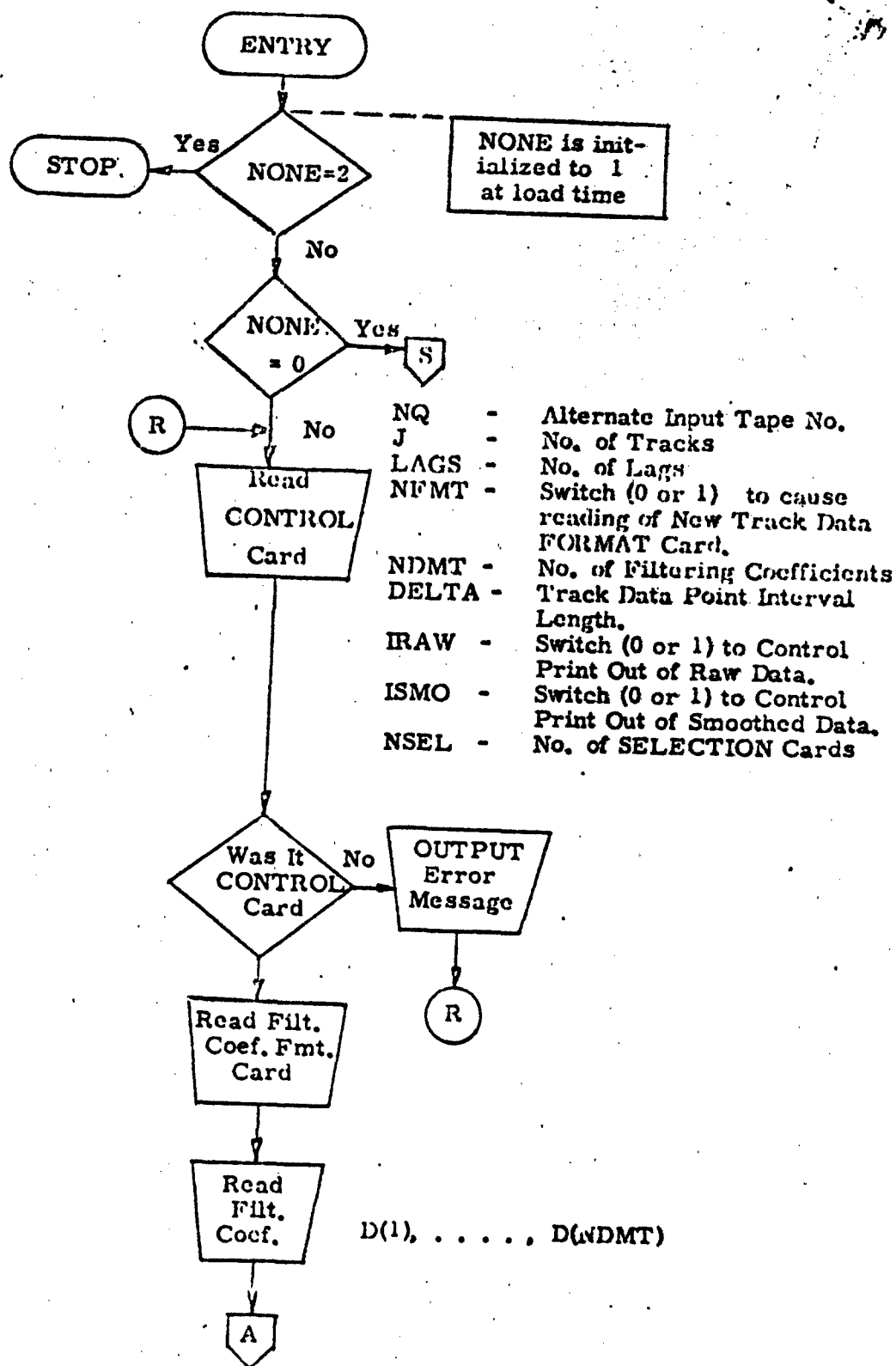
$$(LZ)_h = \frac{1}{m} (QZ)_0 + \frac{2}{m} \sum_{i=1}^{m-1} (QZ)_i \cos \frac{iph}{m} + \frac{1}{m} (QZ)_m (-1)^h$$

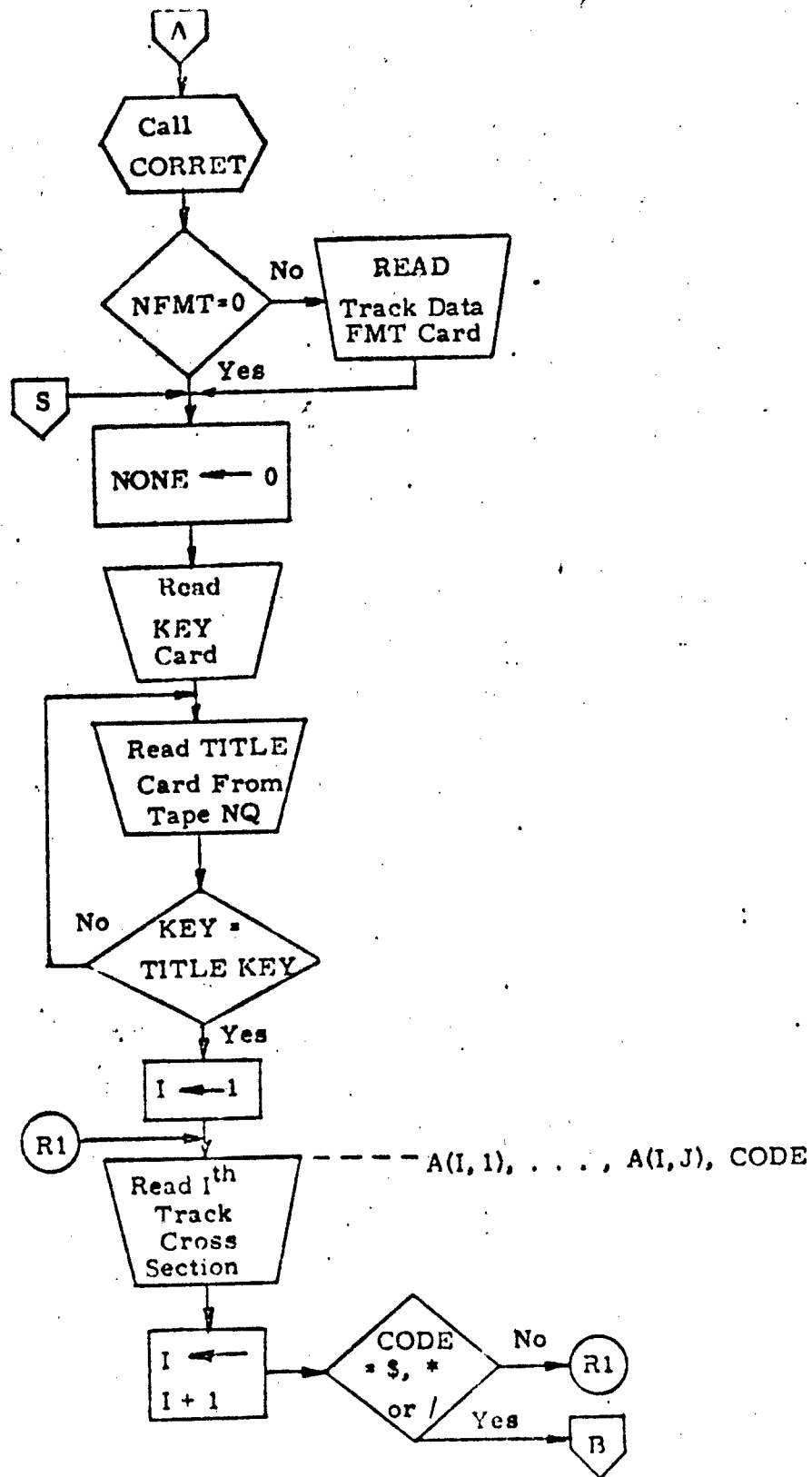
$$(LQ)_h = \frac{2}{m} \sum_{i=1}^{m-1} (QQ)_i \sin \frac{iph}{m}$$

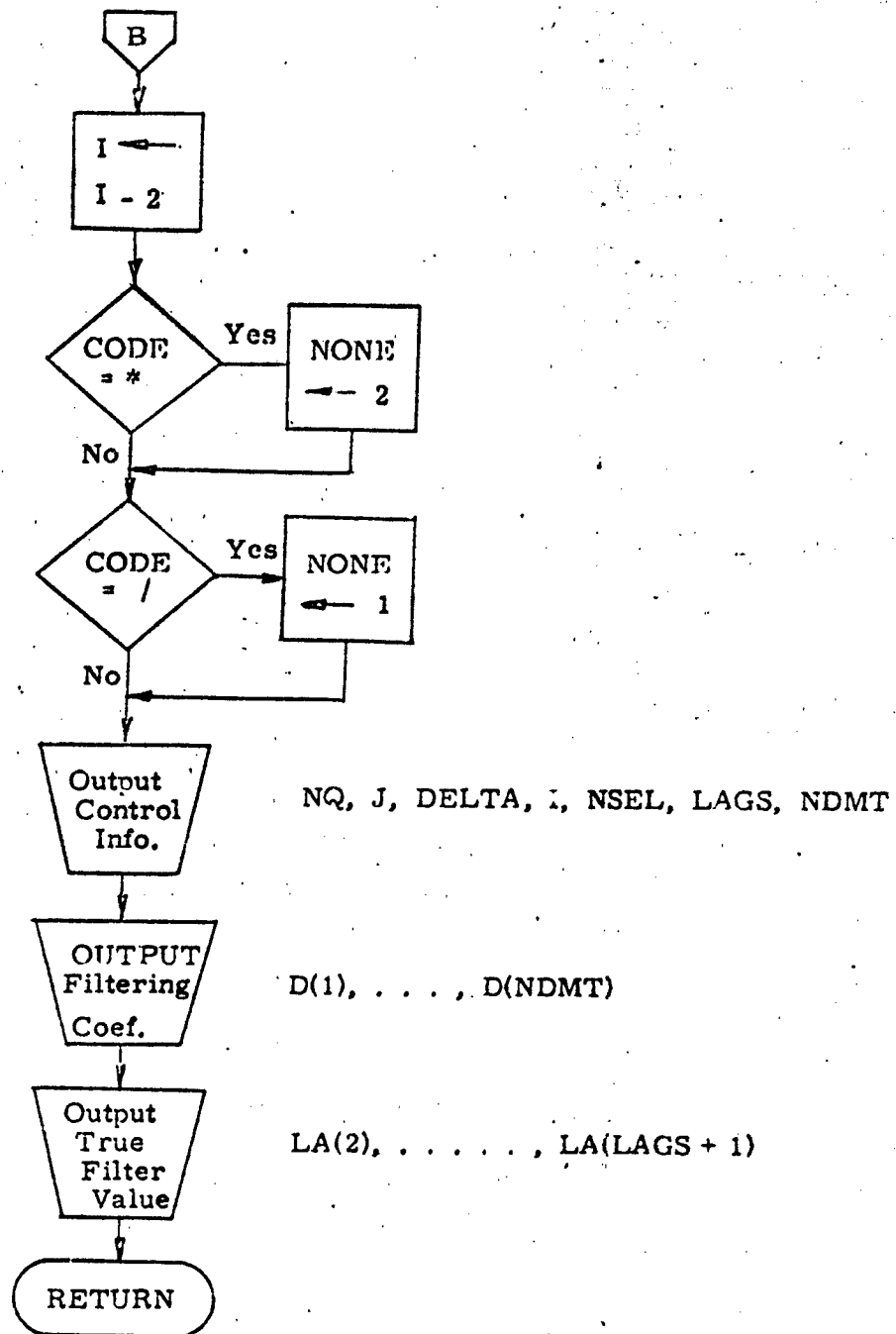
The raw spectral values are subjected to a running average smoothing using coefficients .25, .50, .25, to give the smoothed spectral values denoted $(WX)_h$, $(WY)_h$, $(WC)_h$, and $(WQ)_h$.

OPERATION:

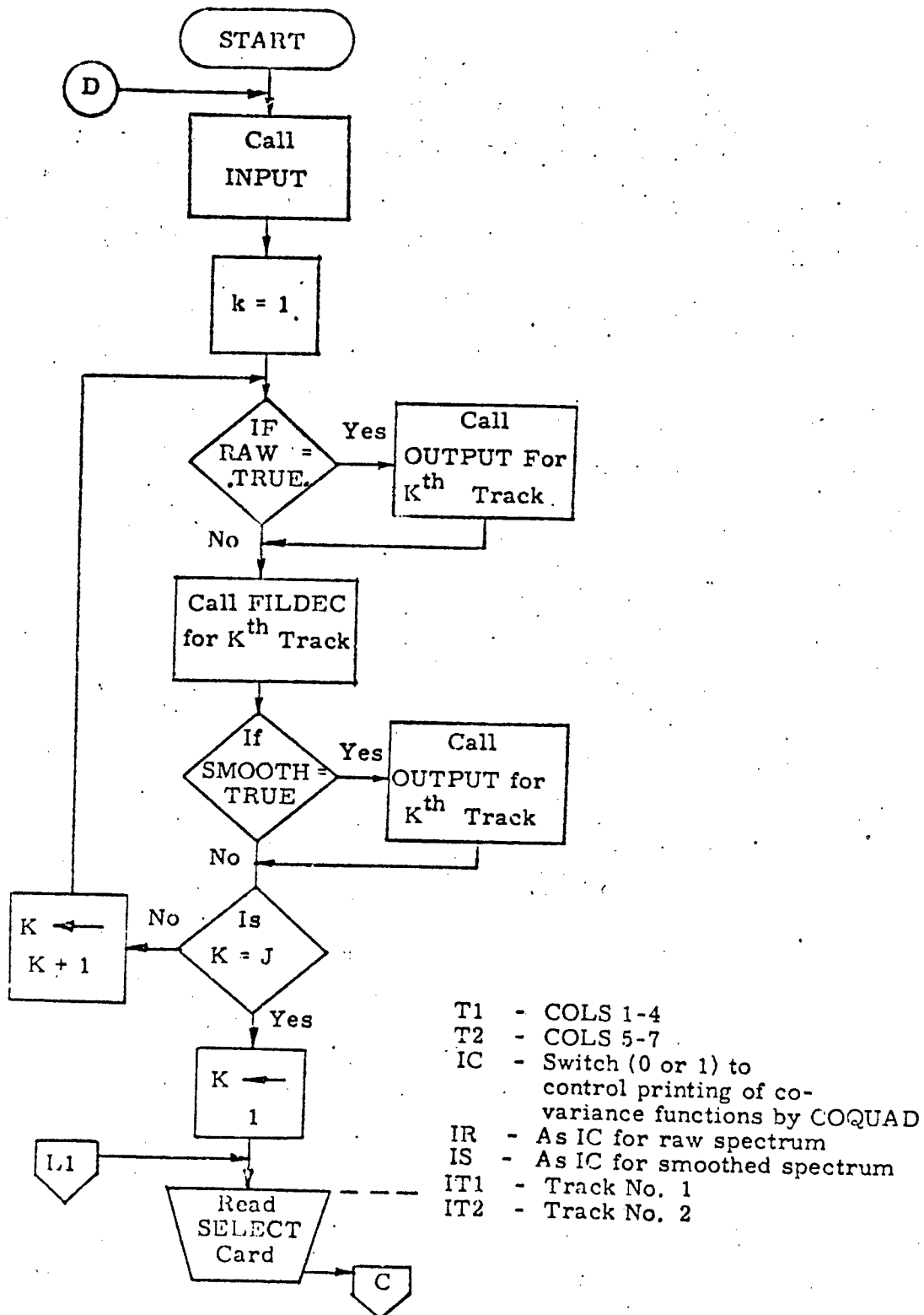
-13-15-

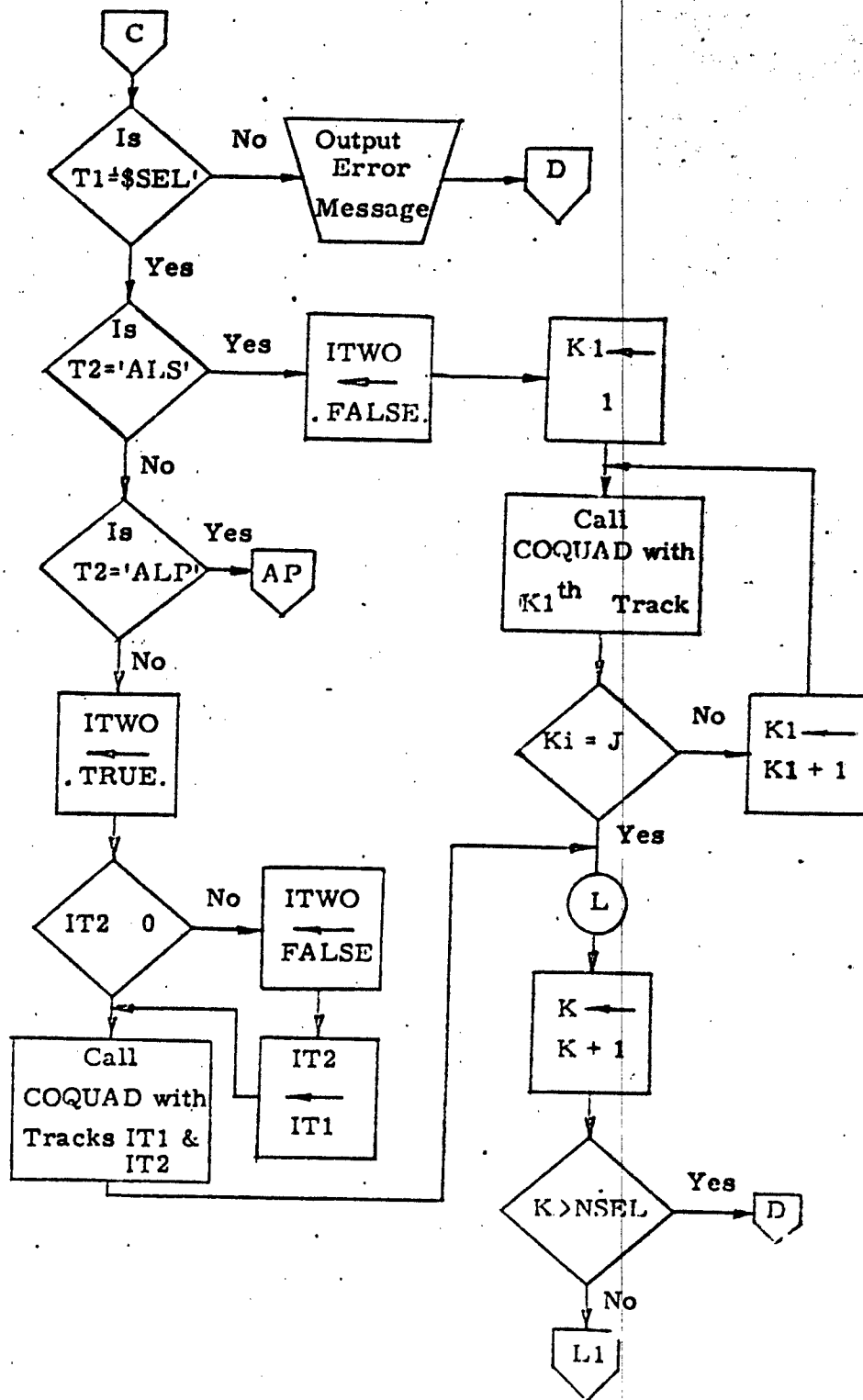


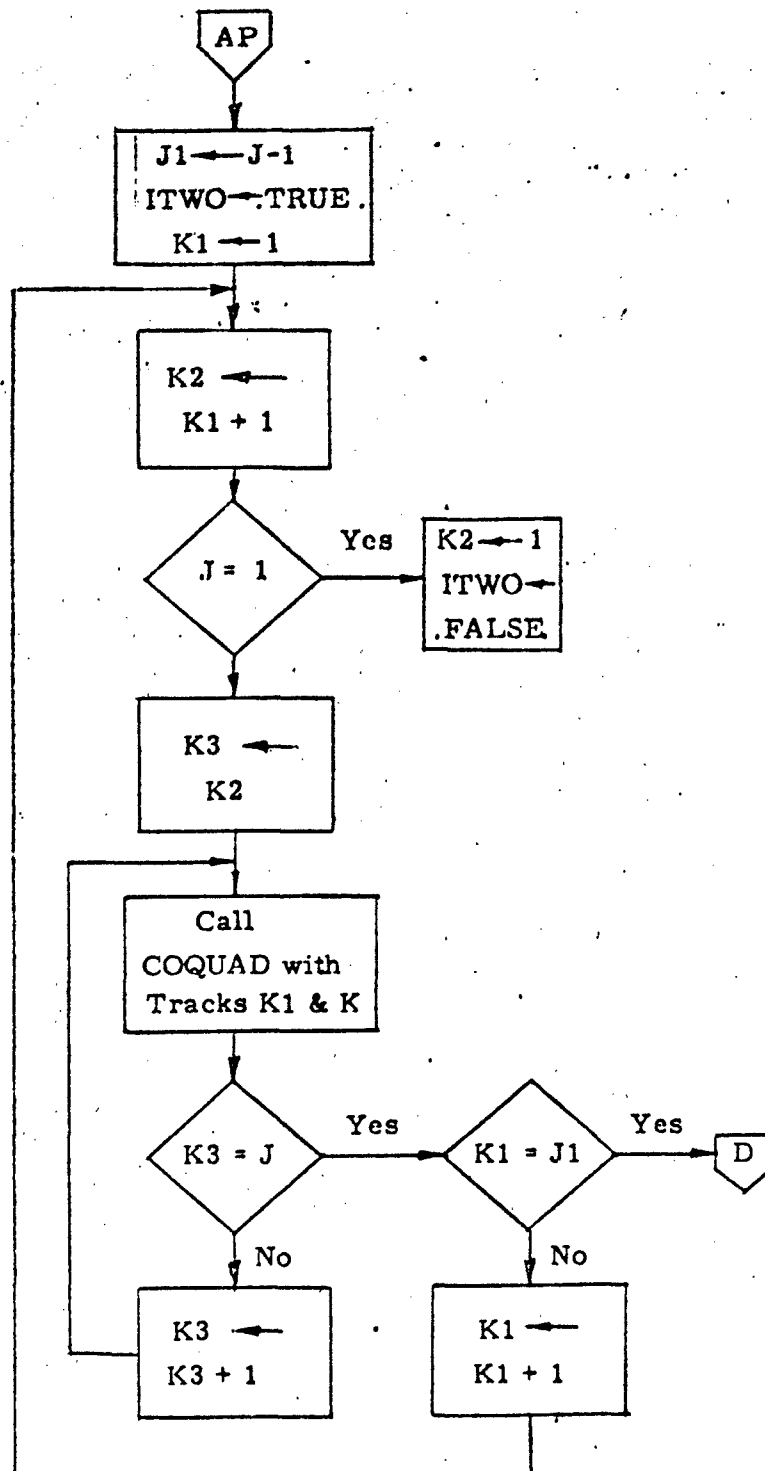




MAIN PROGRAM RVR...







C TWO TRACK POWER SPECTRAL DENSITY PROGRAM

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EXECUTE      ISJOB
SIRJOB      MAP
SIBFTC RVR,,, DECK,PULIST,REF,DD
LOGICAL RAW, SMOOTH, ITWO
DIMENSION A(1050,5), AN(5)
COMMON /DLABEL/ NDMT, D(20), RAW, SMOOTH, NSEL /LIST/ IC, IR, IS,
1 ITWO
DATA ( AN(1), 1 = 1.5 ) / INA, INB, INC, IND, INE /, SEL, ALS,
1ALP / 4MSSEL, 3HALS, 3HALP /
100 CALL INPUT( A, 1, J )
NDATA = 1
DO 200 K = 1, J
IF( RAW ) CALL OUTPUT( A(1,K), 1, AN(K), 1 )
IF( NDMT ,LE, 0 ) GO TO 200
CALL FILDEC( A(1,K), 1, NDATA )
200 IF( SMOOTH ,AND, NDMT ,GT, 0 ) CALL OUTPUT( A(1,K), NDATA, AN(K),
*2 )

DO 300 K = 1, NSEL
READ (5,1) T1, T2, IC, IR, IS, IT1, IT2
IF( T1 ,NE, SEL ) GO TO 900

IF( T2 ,EQ, ALS ) GO TO 310

IF( T2 ,EQ, ALP ) GO TO 320
ITWO = ,TRUE,
IF( IT2 ,GT, 0 ) GO TO 305
ITWO = ,FALSE,
IT2 = -IT1
305 CALL COQUAD( NDATA, A(1,IT1), A(1,IT2), AN(IT1), AN(IT2) )
GO TO 300

310 ITWO = ,FALSE,
DO 311 K1 = 1, J
311 CALL COQUAD( NDATA, A(1,K1), A(1,K1), AN(K1), AN(K1) )
GO TO 300

320 J1 = J = 1
ITWO = ,TRUE,
DO 321 K1 = 1, J1
K2 = K1 + 1
IF( J ,NE, 1 ) GO TO 322
K2 = 1
ITWO = ,FALSE,
322 DO 321 K3 = K2, J
321 CALL COQUAD( NDATA, A(1,K1), A(1,K3), AN(K1), AN(K3) )
300 CONTINUE
GO TO 100

900 WRITE (6,2) K
GO TO 100
1 FORMAT(A4,A3,3I1,2I6)
2 FORMAT(23H10N ATTEMPT TO READ THE 14,79NTH SSEL CARD, NO SSEL CARD

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END
SIBFTC INPUT DECK:FULIST:REP:CD
SUBROUTINE INPUT( A, I, J )

REAL LA
LOGICAL RAW, SMOOTH
DIMENSION A(1050:5), FMT(12), DFMT(12)
COMMON /DLABEL/ NDMT, D(20), RAW, SMOOTH, NSEL /DPLTAX/ DELTA,
1 LAGS /LABEL/ NAME(5) /XXX/ LA(501)
DATA ASTRIC, DOLLAR, SLASH, NONE /-1H, 1H, 1H, 1 /
1 FMT(1) / 13M(F10.0,61XA1) /, 1LIN, 1FIN / 6HSLINEP, 6HSPINIS /

1 IF( NONE .EQ. 2 ) GO TO 6
IF( NONE .EQ. 0 ) GO TO 3

ICTL = 1
11 READ (5:100) ITST, NO, J, LAGS, NFMT, NDMT, DELTA, IRAW, ISMO,
1 NSEL

IF( ITST .EQ. 1FIN ) GO TO 6
IF( ITST .NE. 1LIN ) GO TO 60

RAW = .TRUE.
SMOOTH = .TRUE.
IF( IRAW .EQ. 0 ) RAW = .FALSE.
IF( ISMO .EQ. 0 ) SMOOTH = .FALSE.
IF( NDMT .LE. 0 ) GO TO 2
READ (5:101) DFMT
READ (5:DFMT) ( D(M), M = 1, NDMT )
CALL CORRET
2 IF( NFMT .GE. 1 ) READ (5:101) FMT

3 NONE = 0

4 READ (5:108) KEY
41 READ (NO:102) NAME, KEYT
IF( KEY .NE. KEYT ) GO TO 41
I = 1
5 READ (NO:FMT) ( A(I:N), N = 1, J ), CODE
I = I + 1
IF( CODE .NE. DOLLAR .AND. CODE .NE. ASTRIC .AND. CODE .NE. SLASH
1 ) GO TO 5

I = I - 2
IF( CODE .EQ. ASTRIC ) NONP = 2
IF( CODE .EQ. SLASH ) NONE = 1

WRITE (6:103) NO, J, DELTA, I, NSEL, LAGS, NDMT
IF( NDMT .LE. 0 ) GO TO 51
WRITE (6:104) ( D(M), M = 1, NDMT )
LAGS1 = LAGS + 1
WRITE (6:107) ( LA(M), M = 2, LAGS1 )
51 IF( NO * J * LAGS * NSEL * IFIX( DELTA + .9 ) .EQ. 0 ) WRITE (6:1LIN00520
LIN00530
LIN00540
LIN00550
LIN00560
LIN00570
LIN00580
LIN00590
LIN00600
LIN00610
LIN00620
LIN00630
LIN00640
LIN00650
LIN00660
LIN00665
LIN00670
LIN00671
LIN00672
LIN00675
LIN00676
LIN00679
LIN00680
LIN00690
LIN00700
LIN00710
LIN00720
LIN00730
LIN00740
LIN00750
LIN00760
LIN00770
LIN00780
LIN00790
LIN00800
LIN00810
LIN00820
LIN00830
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LIN00850
LIN00860
LIN00870
LIN00880
LIN00890
LIN00900
LIN00910
LIN00920
LIN00930
LIN00940
LIN00950
LIN00960
LIN00970
LIN00980

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105)		LIN00990
RETURN		LIN01000
		LIN01010
6	WRITE (6,106)	LIN01020
	STOP	LIN01030
		LIN01040
60	WRITE (6,109) ICTL, ITST, NQ, J, LAGS, NPNT, NMNT, DELTA, IRAW,	LIN01041
	1 ISMO, NSEL	LIN01042
	ICTL = 0	LIN01043
	GO TO 11	LIN01044
		LIN01045
		LIN01050
100	FORMAT(A6,12,11,13,11,12,F6,0,211,12)	
101	FORMAT(12A6)	LIN01070
102	FORMAT(6X,5A6,36X18)	LIN01080
103	FORMAT(49H) INPUT PARAMETERS FOR THE FOLLOWING COMPUTATIONS, /ISHOELL	LIN01090
	LEVATION DATA//3X12H LOGICAL TAPE13//3X6H TRACKS7X12//3X6H DELTA F12,6L	LIN01100
	2//3X10H NO. POINTS15/21H NO. NUMBER OF SSEL CARDS14/15H NO. NUMBER OF LAGS1	LIN01110
	34/26H NO. NUMBER OF FILTERING COEF,14)	LIN01120
104	FORMAT(19H) FILTERING COEF. = 3E17,8/(19X3E17,8/1X)	LIN01130
105	FORMAT(175H) ERROR IN ABOVE INPUT, ATTEMPT AT PROCESSING WILL BE	LIN01140
	1ADF.)	LIN01150
106	FORMAT(1H1/1H3//55X,10H THESE THEN//58X,3H ARE//53X,14H THE ANSWERS,	LIN01160
	1, //50X,20H NOW ALL THAT REMAINS//55X,10H TO BE DONE//59X,2H IS//55X,	LIN01170
	29H TO RECALL//53X,14H THE QUESTIONS, //65X,6H BYR...	LIN01180
107	FORMAT(1725X19H ACT. FILTER VALUES//1F19,8,3E17,8/1X)	LIN01190
108	FORMAT(72X18)	LIN01200
109	FORMAT(11,50H) LINE1 CARD EXPECTED BUT NOT FOUND, CARD AS READ/1H	LIN01201
	106XA6,12,11,13,211,F6,0,211,12)	LIN01202
	END	LIN01210
S15FTC	CORRET DECK,FULIST,REF,DD	LIN01390
	SUBROUTINE CORRET	LIN01400
	REAL LA	LIN01410
	COMMON /XXX/ LA(501)/DLABFL/NP,FACTOR(23)/DELTAX/NULL,LAGS	LIN01420
	COMMON /QSQ/ CS(1002),OA(501)	LIN01430
	LAGS1=LAGS+1	LIN01440
	NP1=NP+1	LIN01450
	DO 51 I=1,NP	LIN01460
	OA(I)=0,0	LIN01470
	N=NP1-1	LIN01480
	NJ=1	LIN01490
	DO 51 J=1,N	LIN01500
	OA(I)=OA(I)+FACTOR(J)*FACTOR(NJ)	LIN01510
51	NJ=NJ+1	LIN01520
	OA1=OA(I)*0,8	LIN01530
	DO 52 I=1,LAGS1	LIN01540
52	LA(I)=OA1	LIN01550
	ANG=3,141592654/FLOAT(LAGS)	LIN01560
	LAGTWO=LAGS+LAGS	LIN01570
	DO 53 I=1,LAGTWO	LIN01580
	G=FLOAT(I-1)*ANG	LIN01590
53	CS(I)=COS(G)	LIN01600
	DO 54 I=2,NP	LIN01610
54	LA(I) = LA(I)+OA(I)	LIN01620

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DO 55 I=2,LAGS1
DO 55 J=2,NP
JR=(I-1)*(J-1)
JJ=MOD(JR,LAGTWO)+1
57 LA(I)=LA(I)+CS(J)*QA(J)
DO 56 I=1,LAGS1
56 LA(I)=2.0*LA(I)
RETURN
END
SIBFTC FILDEC DECK,FULIST,REF,DD
SUBROUTINE FILDEC(A,NA,NB)
DIMENSION A(1)
COMMON /DLABFL/ NP,F(23)
NC=NA-NP+1
J=1
DO 11 I=1,NC
S=0.0
DO 10 K=1,NP
L=I+K-1
10 S=S+ F(K)*A(L)
A(J)=S
11 J=J+1
NB=J-1
50 RETURN
END
SIBFTC COQUAD DECK,FULIST,REF,DD
SUBROUTINE COQUAD (NDAT,X,Y,XN,YN)
C*****
C SPECIFICATION STATEMENTS FOR COQUAD
C
LOGICAL ITWO
COMMON /XXX/ ZA(501) /LABEL/ NAME(5) /DELTA/ DELTA,LAGS
COMMON /QSQ/ CS,UX/LIST/ IC,IR,IS,ITWO
DIMENSION X(6000),Y(6000),TERM1(501),TERM2(501),OX(401),OY(501),
*SUMXL(501),SUMXU(501),SUMYL(501),SUMYU(501),PRODX(501),PRODY(501),
*,PRODX(501),PRODY(501),OC(501),OO(501),UX(501),UY(501),UC(501),
*UO(501),WX(501),WY(501),WC(501),WO(501),CS(1002),SN(1002),NFLAG(4)
EQUIVALENCE (PRODX,OX,WX),(PRODY,OY,WY),(PRODX,TERM1,UC),
*(PRODY,TERM2,UO),(SUMXL,UX),(SUMYL,UY),(SUMXU,OC,WC),
*(SUMYU,OO,WO)
DATA PW1, PW2, PW3 / 1M0, 1M1, 1M2 /, LAG /0/
C*****
C INITIALIZATION OF CONSTANTS AND FACTORS FOR COQUAD
C
NDAT=NDAT
IF(LAG,FO,LAGS) GO TO 500
LAG=LAGS
NP=LAGS+1
FLAGS=LAGS
FLAGS2 = FLAGS + FLAGS
FLT = 2.0 * DELTA
FX=(-1)*LAGS
D1=3.141592654
LAGTWO=LAGS+LAGS

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L1N01630
 L1N01640
 L1N01650
 L1N01660
 L1N01670
 L1N01680
 L1N01690
 L1N01700
 L1N01710
 L1N01720
 L1N01730
 L1N01740
 L1N01750
 L1N01760
 L1N01770
 L1N01780
 L1N01790
 L1N01800
 L1N01810
 L1N01820
 L1N01830
 L1N01840
 L1N01850
 L1N01860
 L1N01870
 L1N01880
 L1N01890
 L1N01900
 L1N01910
 L1N01920
 L1N01930
 L1N01940
 L1N01950
 L1N01960
 L1N01970
 L1N01980
 L1N01990
 L1N02000
 L1N02010
 L1N02020
 L1N02030
 L1N02040
 L1N02050
 L1N02060
 L1N02070
 L1N02080
 L1N02090
 L1N02100
 L1N02110
 L1N02120
 L1N02130
 L1N02140
 L1N02150
 L1N02160

ANG=PI/PLAGS	LIN02170
DO 157 I=1, LASTWO	LIN02180
F1=1-I	LIN02190
G=F1*ANG	LIN02200
CS(I)=COS(G)	LIN02210
157 SN(I)=SIN(G)	LIN02220
500 NDAT1=NDATA+1	LIN02230
NDAT2 = NDAT1 + NDAT1	LIN02240
PDATA = N DATA	LIN02250
NU=NDATA-LAGS	LIN02260
C*****	LIN02270
C SUMMATIONS FOR CROSS PRODUCTS	LIN02280
C	LIN02290
SUMX=0.	LIN02300
SUMY=0.	LIN02310
DO 12 J=NP, NU	LIN02320
SUMX=SUMX+X(J)	LIN02330
12 SUMY=SUMY+Y(J)	LIN02340
SUMXL(NP)=0.	LIN02350
SUMXU(NP)=0.	LIN02360
SUMYL(NP)=0.	LIN02370
SUMYU(NP)=0.	LIN02380
DO 13 J=1, LAGS	LIN02390
SUMXL(NP)=SUMXL(NP)+X(J)	LIN02400
SUMYL(NP)=SUMYL(NP)+Y(J)	LIN02410
JJ = NDAT1 - J	LIN02420
SUMXU(NP)=SUMXU(NP)+X(JJ)	LIN02430
13 SUMYU(NP)=SUMYU(NP)+Y(JJ)	LIN02440
SUMXL(NP)=SUMX+SUMXL(NP)	LIN02450
SUMXU(NP)=SUMX + SUMXU(NP)	LIN02460
SUMYL(NP)=SUMY + SUMYL(NP)	LIN02470
SUMYU(NP)=SUMY+SUMYU(NP)	LIN02480
DO 14 J=1, LAGS	LIN02490
JJ=NP-J	LIN02500
JJJ= NDAT1 - JJ	LIN02510
SUMXL(JJ)=SUMXL(JJ+1)+X(JJJ)	LIN02520
SUMYL(JJ)=SUMYL(JJ+1)+Y(JJJ)	LIN02530
SUMXU(JJ)=SUMXU(JJ+1)+X(JJ)	LIN02540
14 SUMYU(JJ)=SUMYU(JJ+1)+Y(JJ)	LIN02550
DO 15 J=1, NP	LIN02560
PRODXX(J)=0.	LIN02570
PRODYY(J)=0.	LIN02580
PRODXY(J)=0.	LIN02590
PRODYX(J)=0.	LIN02600
MN = NDAT1 - J	LIN02610
JM=J	LIN02620
DO 15 I=1, MN	LIN02630
PRODXX(J)=PRODXX(J)+X(I)*X(JM)	LIN02640
PRODYY(J)=PRODYY(J)+Y(I)*Y(JM)	LIN02650
PRODXY(J)=PRODXY(J)+X(I)*Y(JM)	LIN02660
PRODYX(J)=PRODYX(J)+Y(I)*X(JM)	LIN02670
15 JM=JM+1	LIN02680
C*****	LIN02690
C THE CO-VARVARIANCE FUNCTIONS	LIN02700

C	DO 16 I=1,ND	LIN02710
	DPEN = MDAT1 - 1	LIN02720
	PDEN=1./DPEN	LIN02730
	TERM1(1)=PRODX(1)-PDEN*SUNYU(1)*SUMYL(1)	LIN02740
	TERM2(1)=PRODY(1)-PDEN*SUNXU(1)*SUMYL(1)	LIN02750
	QX(1)=PDEN*(PRODX(1)-PDEN*SUNXU(1)*SUMYL(1))	LIN02760
16	QY(1)=PDEN*(PRODY(1)-PDEN*SUNYU(1)*SUMYL(1))	LIN02770
	DO 17 I=1,ND	LIN02780
	TDEN = MDAT2 - 1 - 1	LIN02790
	PTDEN=1./TDEN	LIN02800
	QC(1)=PTDEN*(TERM1(1)+TERM2(1))	LIN02810
17	QO(1)=PTDEN*(TERM1(1)-TERM2(1))	LIN02820
	IF(IC,ND, 0) GO TO 200	LIN02830
	WRITE (6,35) NAME	LIN02840
	IF(ITWO) GO TO 201	LIN02850
	WRITE (6,33) XN	LIN02860
	WRITE (6,36) PW1	LIN02870
	GO TO 202	LIN02880
201	WRITE (6,33) XN, YN	LIN02890
	WRITE (6,36) (PW1, 1 = 1, 4)	LIN02900
202	DO 204 I = 1, ND	LIN02910
	MNP = 1 - 1	LIN02920
	IF(ITWO) GO TO 203	LIN02930
	WRITE (6,22) MNP, QX(1)	LIN02940
	GO TO 204	LIN02950
203	WRITE (6,22) MNP, QX(1), QY(1), QC(1), QO(1)	LIN02960
204	CONTINUE	LIN02970
	*****	LIN02980
C	THE RAW SPECTRA	LIN02990
C		LIN03000
200	QX(ND)=0.5*QX(ND)	LIN03010
	QY(ND)=0.5*QY(ND)	LIN03020
	QC(ND)=0.5*QC(ND)	LIN03030
	QX1=0.5*QX(1)	LIN03040
	QY1=0.5*QY(1)	LIN03050
	QC1=0.5*QC(1)	LIN03060
	DO 65 I=1,ND	LIN03070
	UX(1)=QX1	LIN03080
	UY(1)=QY1	LIN03090
65	UC(1)=QC1	LIN03100
	DO 70 I=2,ND	LIN03110
	UX(I)=UX(I)+QX(I)	LIN03120
	UY(I)=UY(I)+QY(I)	LIN03130
	UC(I)=UC(I)+QC(I)	LIN03140
	UX(ND)=-UX(ND)+QX(I)	LIN03150
	UY(ND)=-UY(ND)+QY(I)	LIN03160
	UC(ND)=-UC(ND)+QC(I)	LIN03170
70		LIN03180
CNOTE	EX=(-1)*LAGS	LIN03190
	UX(ND)= EX+UX(ND)	LIN03200
	UY(ND)= EX+UY(ND)	LIN03210
	UC(ND)= EX+UC(ND)	LIN03220
	UO(1)=0.0	LIN03230
	UO(ND)=0.0	LIN03240

GO(NP)=.5*GO(NP)	LIN03250
DO 80 I=2,LAGS	LIN03260
80 UG(I)=0.0	LIN03270
DO 90 I=2,LAGS	LIN03280
DO 90 J=2,NP	LIN03290
158 JREM=(I-1)*(J-1)	LIN03300
JJ=MOD(JREM,LAGTWO)+1	LIN03310
UX(I)=UX(I)+CS(JJ)*GX(J)	LIN03320
UY(I)=UY(I)+CS(JJ)*GY(J)	LIN03330
UC(I)=UC(I)+CS(JJ)*GC(J)	LIN03340
90 UG(I)=UG(I)+SN(JJ)*GO(J)	LIN03350
DO 95 I=1,NP	LIN03360
UX(I)=FLT*UX(I)	LIN03370
UY(I)=FLT*UY(I)	LIN03380
UC(I)=FLT*UC(I)	LIN03390
95 UG(I)=FLT*UG(I)	LIN03400
IF(I*ME.0) GO TO 300	LIN03410
WRITE (6:34) NAME	LIN03420
IF(ITWO) GO TO 301	LIN03430
WRITE (6:331) XN	LIN03440
WRITE (6:361) PW2	LIN03450
GO TO 302	LIN03460
301 WRITE (6:33) XN: YN	LIN03470
WRITE (6:36) (PW2: I = 1: 4)	LIN03480
302 DO 304 I = 1: NP	LIN03490
NMP = I - 1	LIN03500
IF(ITWO) GO TO 303	LIN03510
WRITE (6:221) NMP: UX(I)	LIN03520
GO TO 304	LIN03530
303 WRITE (6:22) NMP: UX(I): UY(I): UC(I): UG(I)	LIN03540
304 CONTINUE	LIN03550
C*****	LIN03560
C THE SMOOTHED AND CORRECTED SPECTRA	LIN03570
C	LIN03580
300 WX(I)=.5*(UX(I)+UX(2)) /ZA(I)	LIN03590
WY(I)=.5*(UY(I)+UY(2)) /ZA(I)	LIN03600
WC(I)=.5*(UC(I)+UC(2)) /ZA(I)	LIN03610
WO(I)=.5*UG(I) /ZA(I)	LIN03620
WX(NP)=.5*(UX(LAGS)+UX(NP)) /ZA(NP)	LIN03630
WY(NP)=.5*(UY(LAGS)+UY(NP)) /ZA(NP)	LIN03640
WC(NP)=.5*(UC(LAGS)+UC(NP)) /ZA(NP)	LIN03650
WO(NP)=.5*UG(NP) /ZA(NP)	LIN03660
DO 98 I=2,LAGS	LIN03670
WX(I)=(.25*(UX(I-1)+UX(I+1))+.5*UX(I))/ZA(I)	LIN03680
WY(I)=(.25*(UY(I-1)+UY(I+1))+.5*UY(I))/ZA(I)	LIN03690
WC(I)=(.25*(UC(I-1)+UC(I+1))+.5*UC(I))/ZA(I)	LIN03700
98 WO(I)=(.25*(UG(I-1)+UG(I+1))+.5*UG(I))/ZA(I)	LIN03710
IF(IS ME 0) GO TO 50	LIN03720
WRITE (6:32) NAME	LIN03730
IF(ITWO) GO TO 401	LIN03740
WRITE (6:331) XN	LIN03750
WRITE (6:361) PW3	LIN03760
WRITE (6:211)	LIN03770
GO TO 402	LIN03780

401	WRITE (6,33) XN, YN	LIN03790
	WRITE (6,36) (PW3, 1 = 1, 4)	LIN03800
	WRITE (6,21).	LIN03810
402	DO 404 I = 2, NP	LIN03820
	NMP = I - 1	LIN03830
	IF (ITWO) GO TO 403	LIN03840
	WRITE (6,22) NMP, WX(I)	LIN03850
	GO TO 404	LIN03860
403	WRITE (6,22) NMP, WX(I), WY(I), WC(I), WO(I)	LIN03870
404	CONTINUE	LIN03880
	50 RETURN	LIN03890
C*****		LIN03900
C	FORMAT STATEMENTS	LIN03910
C		LIN03920
21	FORMAT (6X,1H0,5X,4(4H----,10X))	LIN03930
211	FORMAT(9X,1H05X4H----	LIN03940
22	FORMAT(X,16,1P4E14,3)	LIN03950
221	FORMAT(4X,16,1P4F14,3)	LIN03960
33	FORMAT(11X\$HITEM A1,11H WITH ITEM A1//)	LIN03970
331	FORMAT(11X\$HITEM A1//)	LIN03980
361	FORMAT(9X,1HP4XA1,4HY(P)/1X)	LIN03990
36	FORMAT(6X,1HP4XA1,4HY(P)9XA1,4HY(P)9XA1,4HC(P)9XA1,4HO(P)/1X)	LIN04000
35	FORMAT(32H) CO-VARIANCE FUNCTIONS FOR 5A6/1X)	LIN04010
34	FORMAT(32H) THE RAW SPECTRUM FOR 5A6/1X)	LIN04020
32	FORMAT(32H) SPECTRAL ESTIMATES FOR 5A6/1X)	LIN04030
	END	LIN04040
SOATA		

APPENDIX C

Two Dimensional Power Spectral Density Program

1. Field Recording of Data

The field recording of survey data should follow a pattern that simplifies transfer of the data to IBM cards. The following pattern is recommended.

The survey books should have, in addition to ruled horizontal lines, six vertical columns. The left column is for the x-coordinate numbers. The remaining columns are for elevation data in the order below.

H ₀₀	H ₀₁	H ₀₂	H ₀₃	H ₀₄
H ₁₀	H ₁₁	H ₁₂	H ₁₃	H ₁₄
H ₂₀	H ₂₁	H ₂₂	H ₂₃	H ₂₄

etc.

On the next pages the first five lines of ground height should be completed. The x-axis heights then may be read in the left columns of the first several pages. The lines of y-coordinates 5 through 9 should be entered in the five columns of the next pages, etc.

Suppose the coordinate system on the ground were right hand one, i.e., standing at the (0,0) corner facing the y-axis side of the square, the x-axis side is to the right. The program prints out the raw data and the smoothed data in a right hand system also, but the y-axis heights are horizontally listed. The identification of the ground directions with the print-cut is easily made with this in mind. The directional aspects of both the lagged products and spectral estimates outputs follow this pattern. They are in the same sense as the ground, but the positive y-axis is to the right, the positive x-axis is down.

2. Computer and Operating System

The program uses the IBM 7090 or 7094 computer. The standard IBSYS/IBJOB (version 12) operating system will operate the source deck if the 'TIME' subroutine is modified or dummied (see flow chart). Since different systems use different logical tape numbers, the standard input tape, 5, and output tape, 6, may be inconsistent. (See flow chart for appropriate modifications.)

3. General Purpose

(A) Processing of a raw elevation matrix.

Given as input a raw elevation matrix (adjusted for instrument height) the program computes the following matrices:

- (a) Smoothed elevation matrix
- (b) Mean lagged products
- (c) Raw spectrum
- (d) Smoothed spectrum
- (e) Lagged products of smoothing coefficients
- (f) Fourier transforms of L.P.S.C.
- (g) Corrected spectrum

Any of these items may be written, optionally, on SYSOU1. In addition, items (a), (f), and (g) above are written on an alternate output tape.

(B) Processing a smoothed elevation matrix.

Using the alternate output tape produced by part (A), as input*, a subsequent run may be made which will produce items (b), (c), (d), and (g) for a selected submatrix of the smoothed matrix, with (g) for this submatrix saved on an alternate output tape.

*It is recommended that this facet of the PSD program be used only in conjunction with input tapes produced as alternate output tapes in part (A).

4. Input Data Format

In explanation of card preparation for all runs, the following terminology will be used.

All data will be positioned on a card by specifying column limits. 'COLS N - M' means that the data item involved must be punched in columns N through M, N and M included.

Numerical data will be of the type floating point (denoted by [F]) or integer (denoted by [I]). Floating point numbers must have the decimal point punched and lying within the column limits. Integer numbers must be right adjusted in the allotted columns, i.e., the units digit punched in column M; the decimal point is not punched.

5. Input Specifications

Due to the potentially large amount of data involved, both in size of input matrices and number of input matrices, a flexible and, hopefully, simple set of input options has been provided.

A raw elevation matrix is punched in the following manner, five numbers per card in (F) format. The elements of the first row and the first five columns are punched in the first card--

COLS	1 - 10	element of row 1, col 1
	11 - 20	element of row 1, col 2
	21 - 30	element of row 1, col 3
	31 - 40	element of row 1, col 4
	41 - 50	element of row 1, col 5

In the same manner, the elements of the first five columns and the second row are punched in the second card. This process is continued until the elements of the first five columns and the last row are punched. The second five columns are punched in exactly the same manner. Suppose the number of columns is not a multiple of five. In this case, the last few columns are punched in exactly the same manner as above; e.g. if the number of columns is 23, the last 3 columns are punched using only columns

1 - 10, 11 - 20, and 21 - 30.

Each input matrix has associated with it a matrix title card which contains a matrix number and identification information. The format for this card is:

COLS	1 - 72	any alphabetic text
	73 - 80	matrix number (I)

The alphabetic text in columns 1 - 72 will be printed at the top of each output page.

Each elevation matrix must be followed by a matrix termination card. The format for this card is

COLS	1 - 71	not read
	72 - 72	termination character
	73 - 80	not read

Each matrix which is to be processed requires a matrix control card which controls tape assignments, output options, etc. The format for this card is

COLS	1 - 6	\$GRIDP
	7 - 8	=blank or 0, all input is on the system input tape.
		=n, matrix title card, elevation matrix and matrix termination card are on logical tape n, in that order.
	9 - 10	=m, logical tape m is alternate output tape.
	11 - 12	=0 or blank, this is a raw elevation matrix.
		=1, this is a smoothed elevation matrix.
	13 - 14	=0 or blank, continuous processing of all input.
		=1, after each matrix is processed the program pauses after printing on-line instructions to the operator to allow continuing or terminating the run.

- 15 - 16 =0 or blank, for all matrices in all runs, with the following exception: Suppose 3 matrices have been processed and their output written on an alternate output tape. The current run is to process several more matrices and it is desirable to write the alternate output from this run on the same tape reel, after the output from the first 3. In this situation, this field on the \$GRIDP card for the first matrix only is punched 01.
- 17 - 18 ≠0 or blank, the elapsed time is printed after each of the items (a) through (g) is computed.
 =0 or blank, no timing is done.

The following fields control the suppression of output on SYSOUL of the indicated items. 0 or blank suppresses output of that particular item while 01 causes the item to be written.

- COLS 19 - 20 elevation matrix as read.
 21 - 22 smoothed elevation matrix.
 23 - 24 mean lagged products.
 25 - 26 raw spectrum.
 27 - 28 smoothed spectrum.
 29 - 30 lagged products of smoothing coefficients.
 31 - 32 Fourier transforms of L.P.S.C.
 33 - 34 corrected spectrum.
 35 - 72 not read
 73 - 80 matrix number (I). The program will search the tape which is specified as being the matrix tape (if cols 7-8 are 0 or blank, SYSIN1, if cols 7-8=n, logical tape n) for a matrix title card with this number in cols 73-80.

Data Interval Card

COLS 1 - 10 column interval (F)
 11 - 20 row interval (F)

Matrix Size Card

COLS 1 - 10 number of columns in the elevation matrix. (I)
 11 - 20 number of rows in the elevation matrix. (I)
 21 - 30 value of ρ . i.e. (the number of columns in the smoothing coefficient matrix - 1)/2. (I)
 31 - 40 value of σ . i.e. (the number of rows in the smoothing coefficient matrix - 1)/2. (I)
 41 - 50 value of MX. (I)
 51 - 60 value of MY. (I)

The corrected spectrum will be
 (2 * MX + 1) by (2 * MY + 1)

The G- matrix or spectral smoothing matrix (3 by 3)
 is presented on punched cards in the following format:

COLS 1 - 10 element in row 1, column 1 (F)
 11 - 20 element in row 1, column 2
 .
 .
 61 - 70 element in row 3, column 1

second card

COLS 1 - 10 element in row 3, column 2
 11 - 20 element in row 3, column 3

The B-matrix or matrix of smoothing coefficients has $2\rho + 1$ columns and $2\sigma + 1$ rows. As it is symmetrical about the origin, only the upper half of the plane ≥ 0 is specified in $(2\sigma + 1) * (\rho + 1)$ numbers. That is, columns $\rho, \rho + 1, \dots, 2\rho + 1$.

Punching by columns, 7, 10 column (F) fields per card, column p is punched, then column $p + 1$, etc.

Finish Card

The format for this card is:

COLS 1 - 6 \$FINIS

6. Deck Set-up - Single Elevation Matrix

With the above mentioned cards, a complete deck, set up to process one raw elevation matrix consists of the following cards in the indicated order. This illustrates deck set-up if no alternate input tape is specified.

\$JOB

Installation identification card.

\$EXECUTE IBJOB

\$IBJOB

BINARY OR SOURCE DECK FOR PSGRID PROGRAM

\$DATA

\$GRIDP

Matrix title card	*
Data interval card	#
Matrix size card	#
G-matrix	#
B-matrix	#
Elevation matrix	*
Matrix termination card	*

\$FINIS

If an alternate input tape is specified, the *'ed items do not appear on the system input tape but are placed on the alternate unit in the following order.

Matrix title card
Elevation matrix
Matrix termination card

7. Deck Set-up - More Than One Elevation Matrix

To process more than one elevation matrix per run, the termination characters on the matrix termination cards control the input for the next matrix to be processed.

- * in column 72 - This matrix is the last matrix to be processed in this run. Execution will be terminated after this matrix is processed.
- / in column 72 - In processing the next matrix, #'ed items are to be read in again.
- \$ in column 72 - In processing the next matrix, #'ed items will be the same as for this matrix, therefore these items are not included after the \$GRIDP card for the following matrix.

The last card of every data deck must be a \$FINIS card. There should be only one \$FINIS card for each run.

8. Output Specifications - Alternate Output Tape

The information written on the alternate output tape during the processing of a raw elevation matrix is organized in the following manner:

Matrix Title Card (as read)
Data Interval Card (as read)
Matrix Size Card (as read)

except

COLS 1 - 10 number of
columns in
smoothed
matrix

11 - 20 number of
rows in
smoothed
matrix

G-matrix
Smoothed Matrix*
Fourier Transforms of L.P.S.C.**
Matrix Termination Card - Termination Character/
Matrix Title Card

COLS 1 - 72 (as read)
73 - 80 (as read) +5

Corrected Spectrum Dimensions

COLS 1 - 10 number of columns in correc-
ted spectrum
11 - 20 number of rows in corrected
spectrum

Corrected Spectrum**

Matrix Termination Card - Termination Charac-
ter \$ except for last
matrix in run, in
which case termina-
tion character is *
and COLS 73-80 con-
tain 99999999

Due to the problems created by the necessity of
finite representation of numbers, the three *'ed items
are written on the alternate output tape in a manner
which will preserve the entire machine representation
of their values. The format for all of these numbers
is ± 0.zxxxxxxxE+yy. This notation represents the num-
ber

± 0.xxxxxxxx X 10 ± yy

Numbers written in this notation always require 15 columns and x is always non-zero, unless the number itself is zero.

* The smoothed matrix is written in a manner analogous to that of the raw matrix, i.e., 4 columns at a time, the values occupying COLS 1 - 15, 16 - 30, 31 - 45 and 46 - 60.

** The Fourier transforms of L.P.S.C. and the corrected spectrum are written in a slightly different manner, i.e., placing 4 numbers per card image the entire first row is written. Starting with the next field, the second row is written. This process continues until all rows have been written.

9. Deck Set-up - Processing a Submatrix of a Smoothed Matrix

Using the alternate output tape, described in 8., as the alternate input tape, any submatrix of a smoothed matrix may be processed as indicated in 3.(B). Deck set-up is as indicated in 6. and 7. with the following exceptions:

The matrix control card (\$GRIDP card) must have '01' punched in columns 11 - 12.

All #'ed and *'ed items in 6. are removed and replaced by the following submatrix card.

COLS	1 - 10	lower column limit*
	11 - 20	upper column limit
	21 - 30	lower row limit
	31 - 40	upper row limit

*Both rows and columns are numbered starting at 1, even though the print-out in the raw matrix run begins numbering at 0.

SUPPLEMENT A

to

Two-Dimensional Power Spectral Density Program Notes

The PSD program is organized as a main program and four subroutines. Labeled common is used where appropriate and identical variable names are used when items are transmitted via labeled common. See Supplement B for a list of the important variable names and their usage.

The following is a brief description of each of the decks which comprise the PSD program. Flow charts are attached for the main program, deck name IN, and the major computational subroutine, deck name PSGRID. It is assumed that the source listings of the remaining decks are self-explanatory.

- 'CLOCK' A machine language program which places the integer number representing the remaining execution time (in .6 seconds) in the AC each time it is called.
- 'TIME' A FORTRAN subroutine which prints the total elapsed time (time since last call with zero argument) and the time elapsed since the last call, in minutes and seconds.
- NOTE: Both of these decks may be removed and a dummy 'TIME' deck substituted if the user so desires.
- 'WRITER' A FORTRAN subroutine which writes the argument matrix on the output tape, 6, 5 columns at a time, indexing the rows and columns as specified by argument values.
- 'PSGRID' A FORTRAN subroutine which computes and calls 'WRITER' to write items (b) through (g), given the smooth matrix.
- 'IN' The FORTRAN main program which does all input for both raw and smoothed matrix runs, computes the smoothed matrix if necessary and calls 'PSGRID' for the remaining computations.

Included with the source deck of the PSD program are two file specification decks. These assume that FORTRAN logical tape 7 will be designated as the alternate input tape and FORTRAN logical tape 8 will be the alternate output tape. Both tapes are made up of 80 character logical and physical records, i.e. card images. This structure must be used to be consistent with READ and WRITE statements throughout the PSD program.

SUPPLEMENT B

to

Two-Dimensional Power Spectral Density Program Notes

Symbol Table

<u>Equation Symbol</u>	<u>Name</u>	<u>Program Symbol</u>	<u>Max. Size</u>
g_{ij}	The Spectral Smoothing Matrix	G	3x3
B_{rs}	The Smoothing Coefficients	B	25x25
H_{ij}	The Raw Elevation Matrix	H	105x101
h_{ij}	The Smoothed Matrix	SH	105x101
γ_{ab}	The Mean Lagged Products	GA	50x25
f_{ab}	The Raw Spectrum	F	50x50
T_{uv}	The Smoothed Spectrum	FB	50x50
W_{uv}	The Lagged Products of the Smoothing Coefficients	W	50x25
Φ_{γ}	The Fourier Transforms of W_{uv}	PHI	50x50
f_{ab}^*	The Corrected Spectrum	FS	50x50

Single Location Variables

$NX = N_x + 1$, the width of the H matrix.

$NY = N_y + 1$, the height of the H matrix.

$NRHO = \rho$, the horizontal limits of the B matrix.

$NSIG = \sigma$, the vertical limits of the B matrix.

$NBR = 2\rho + 1$, the width of the B matrix.

$NBS = 2\sigma + 1$, the height of the B matrix.

$NHR = \rho + 1$

- C-14 -

NHS = $\sigma + 1$

NSHX = $N_x + 1 - 2p = n_x + 1$, the width of the h matrix.

NSHY = $N_y + 1 - 2\sigma = n_y + 1$, the height of the h matrix.

MX = m_x , the horizontal limits of the σ and f matrices.

MY = m_y , the vertical limits of the σ and f matrices.

NGX = $2m_x + 1$, the width of the matrix.

NFX = NGX

FX = NGX

NFY = $2m_y + 1$, the height of the f matrix.

FY = NFY

NGHX = $m_x + 1$

NGHY = $m_y + 1$

NFBX = $2m_x$

NFBY = $2m_y$

N2R = 2

NWX = 4 + 1, the width of the W matrix.

DX = x, the horizontal data interval.

DY = y, the vertical data interval.

INTAPE = the alternate input tape number.

OUTAPE = the alternate output tape number.

FLAG = 0 for raw run, $\neq 0$ for smoothed run.

IBUG = switch for on-line messages.

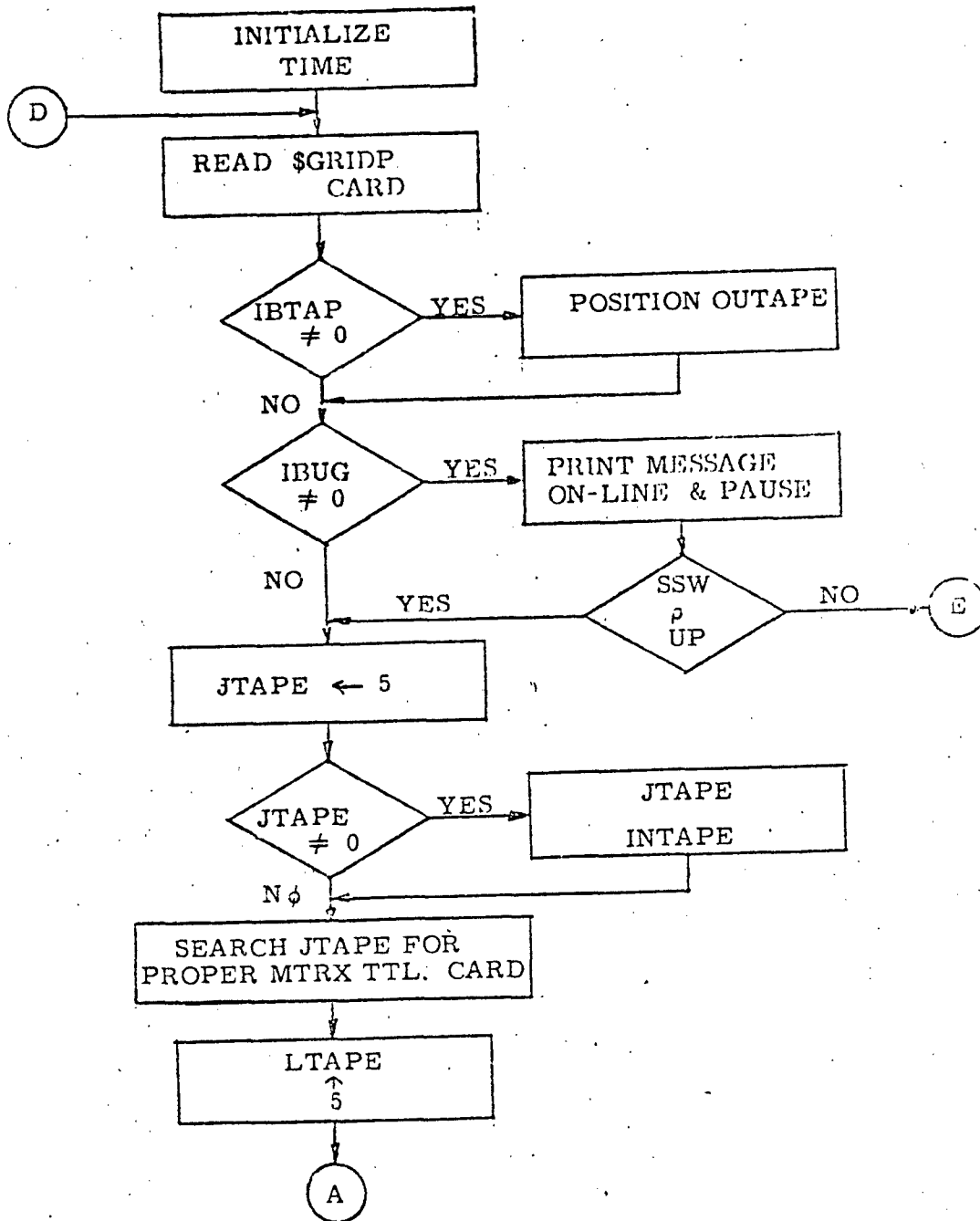
IBTAP = switch for previously-processed alternate output tape.

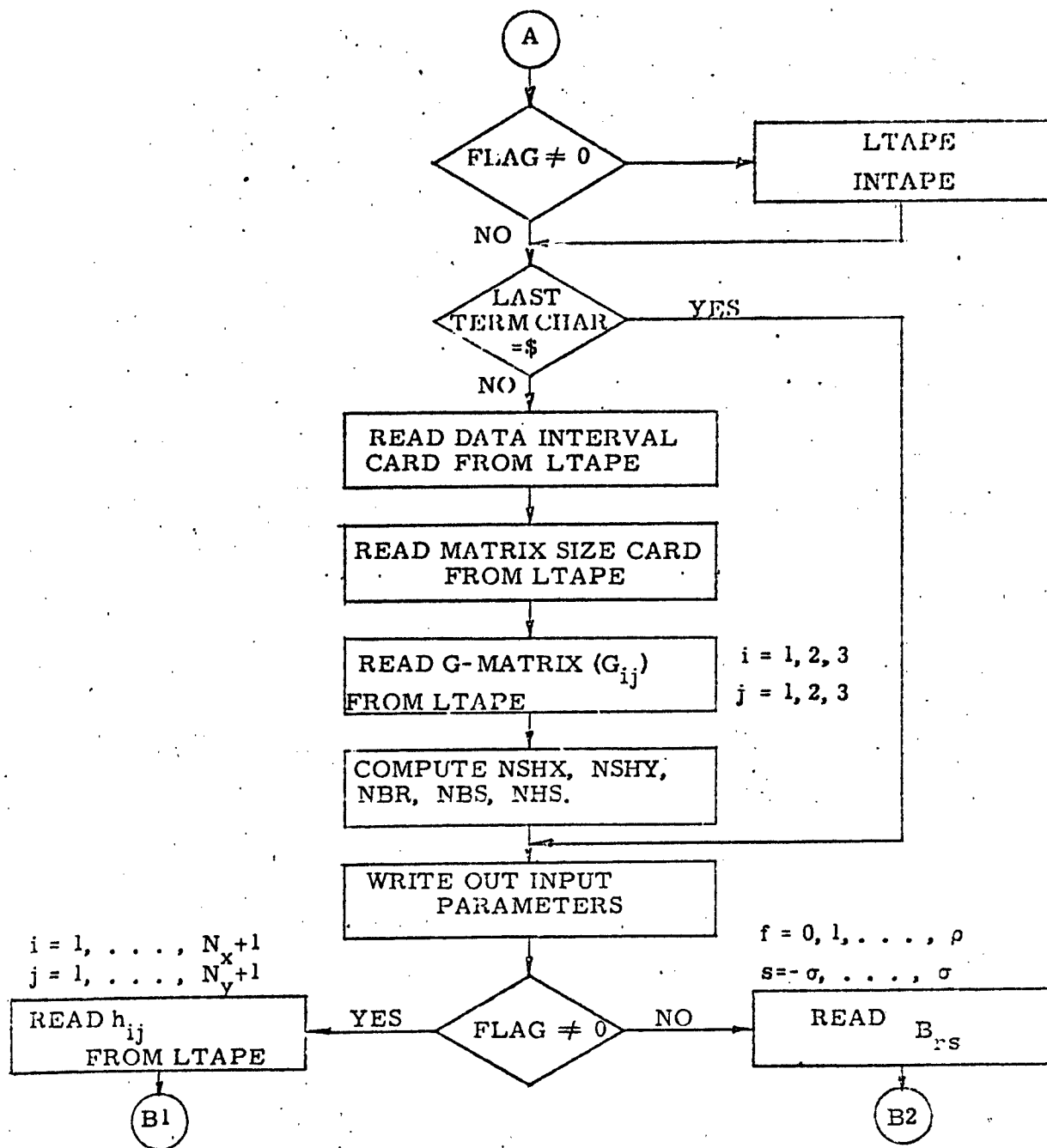
- C-15 -

ITIME = switch for timing print-outs.

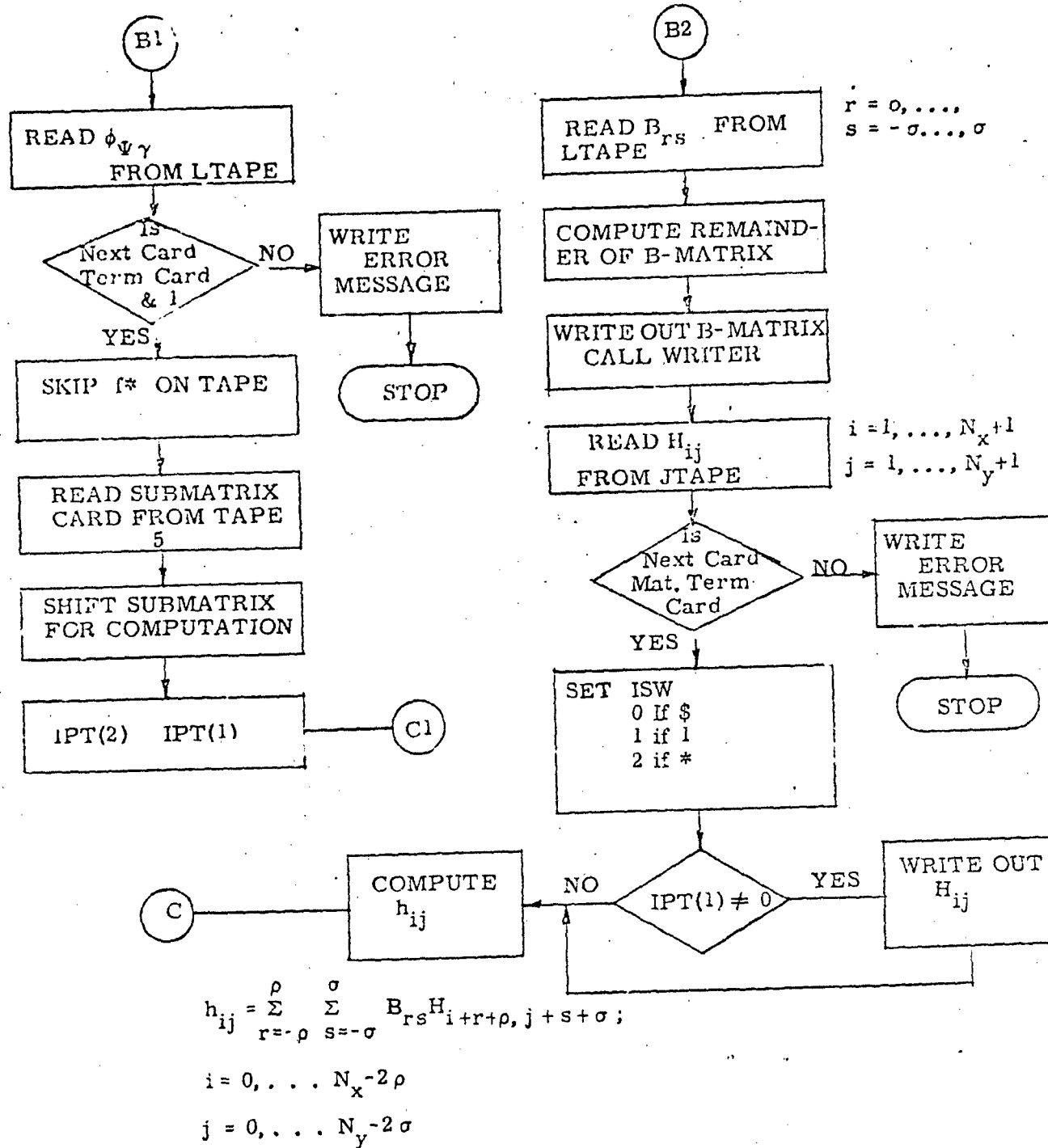
IPT(1) through IPT(8) = printing switches for raw elevation matrix and items (a) through (g) [listed under 3.(A) respectively.

APPENDIX C - FLOW CHART
MAIN PROGRAM
'IN'

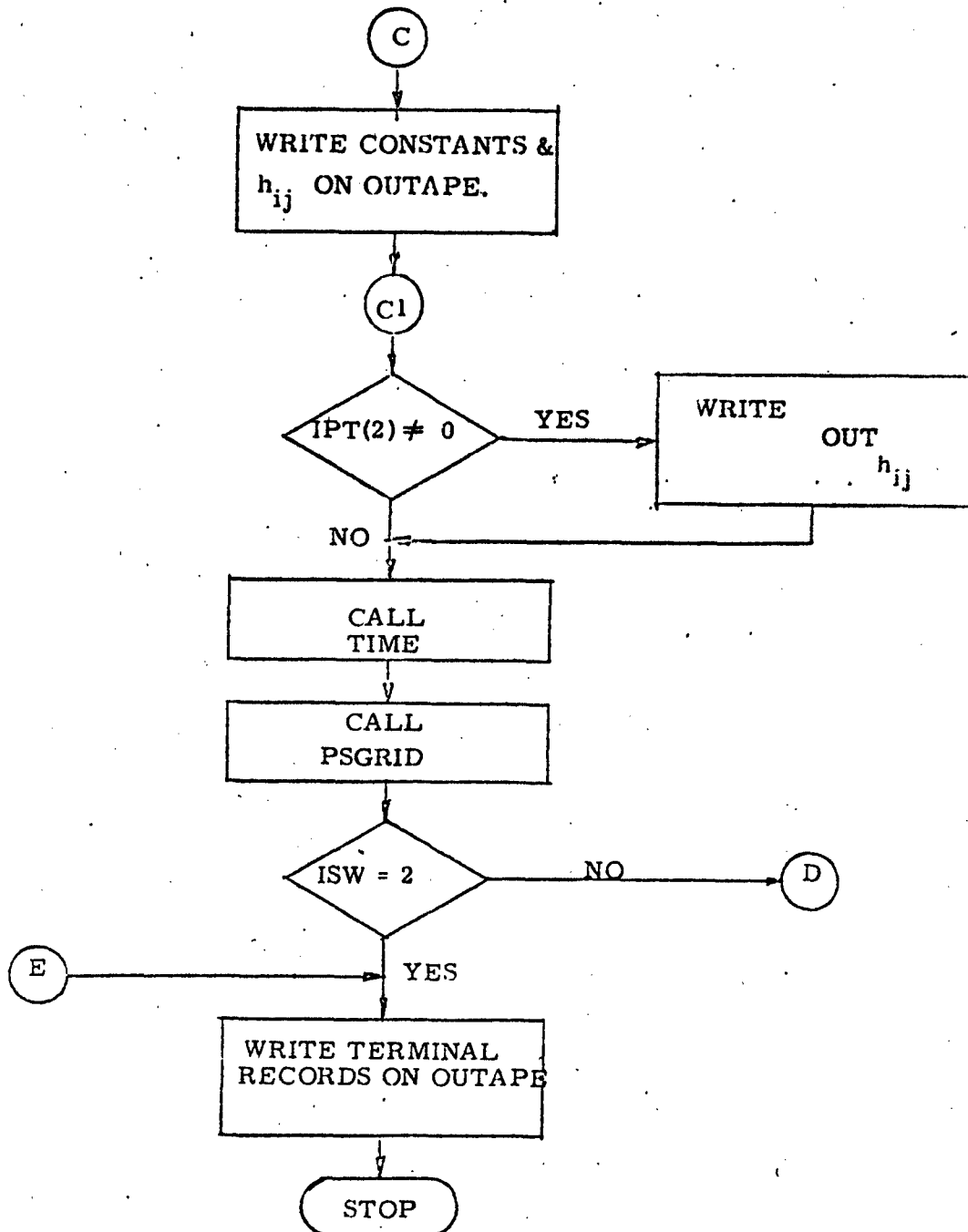




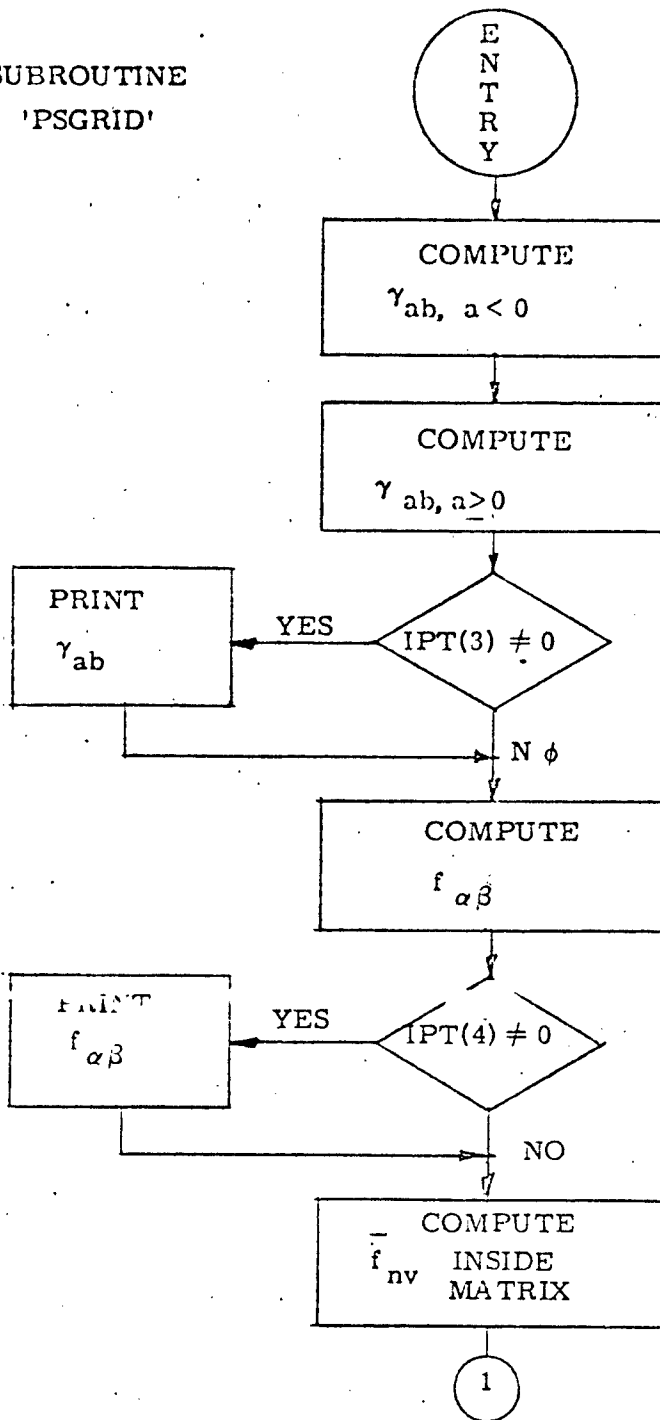
MAIN PROGRAM
'IN'



MAIN PROGRAM
'IN'



SUBROUTINE
'PSGRID'



$$\gamma_{ab} = \frac{1}{(n_x - |a|)(n_y - |b|)}$$

$$\sum_{k=0}^{n_x} \sum_{j=0}^{n_y} h_{kj} h_{k+a, j+b}$$

$$\text{where } n_x = N_x - 2\rho + 1$$

$$n_y = N_y - 2\sigma + 1$$

and

$$-m_x \leq a \leq m_x$$

$$-m_y \leq b \leq m_y$$

$$f_{\alpha\beta} = \Delta x \Delta y \sum_{a=n_x}^{m_x} \sum_{b=m_y}^{m_y}$$

$$\gamma_{2b} \cos \left[2\pi \left(\frac{a\alpha}{2m_x + 1} + \right. \right.$$

$$\left. \frac{b\beta}{2m_y + 1} \right)$$

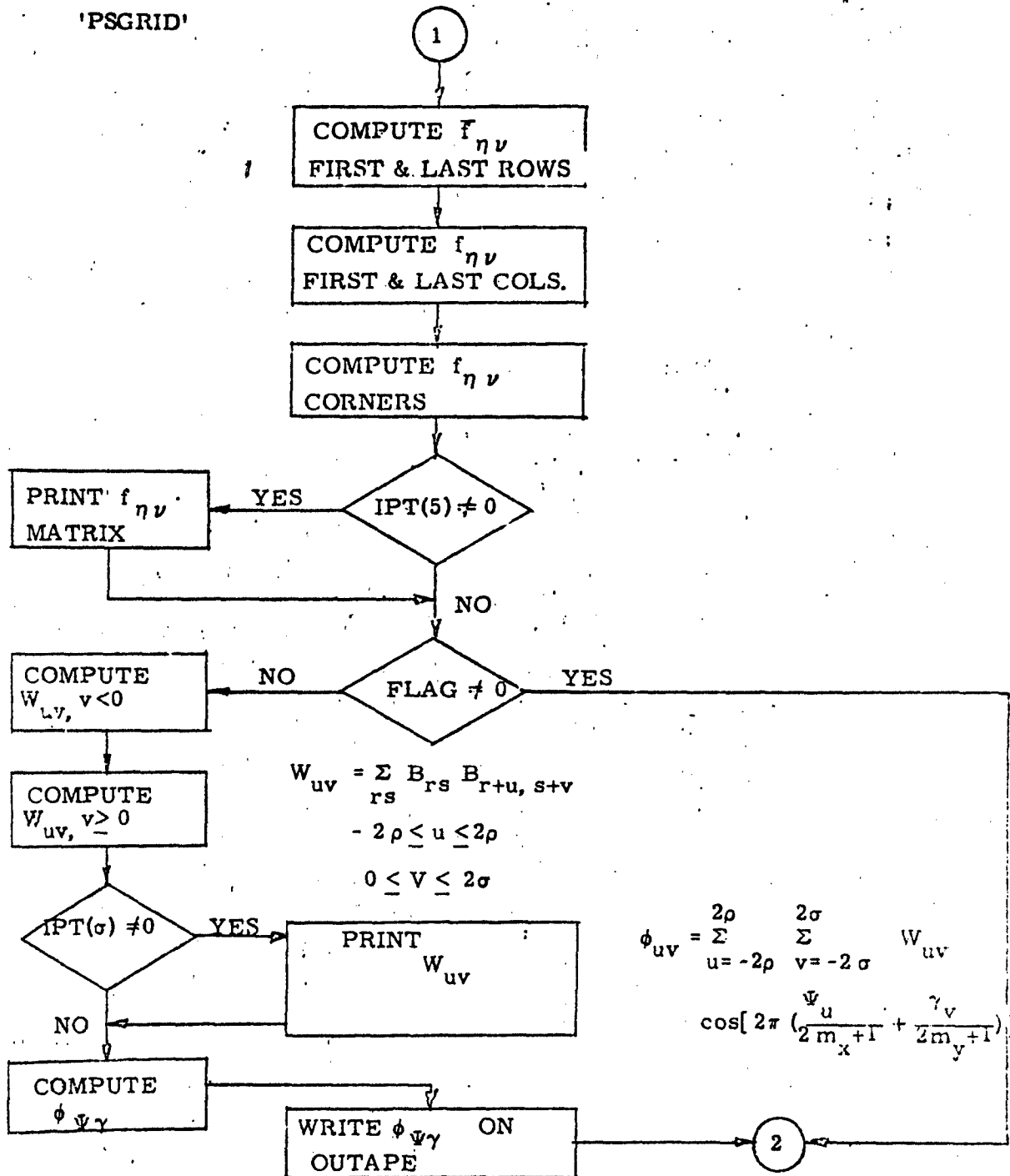
$$\text{and } -m_x \leq \alpha \leq m_x$$

$$-m_y \leq \beta \leq m_y$$

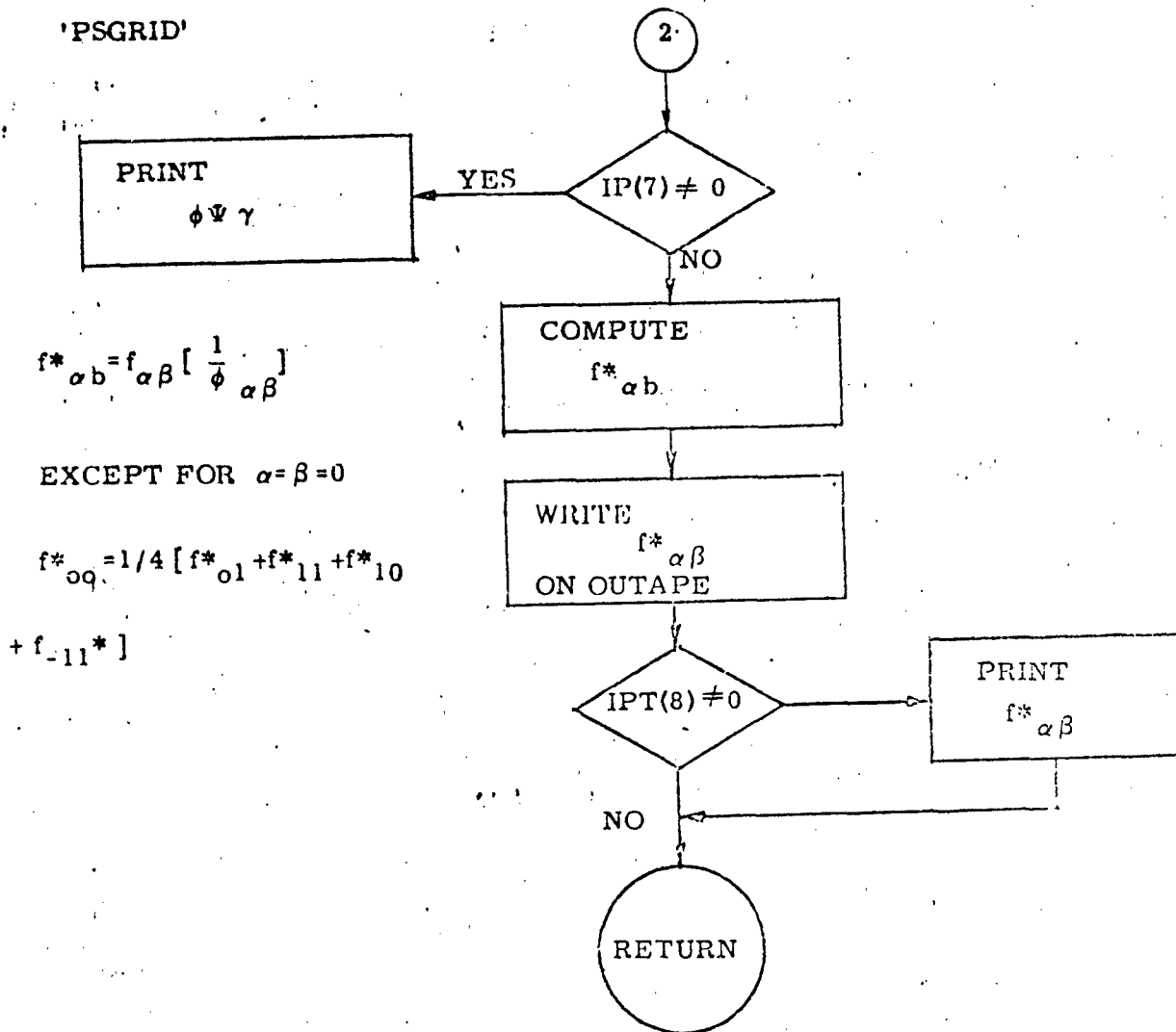
$$f_{nv} = \sum_{j=-1}^1 \sum_{j=-1}^1 j_{2j} f_{\eta+2, \nu+j}$$

and if $\eta+1$ or $\nu+j$ occurs outside the border, take the reflected index inside.

SUBROUTINE
'PSGRID'



SUBROUTINE
'PSGRID'



C AREA SPECTRAL DENSITY PROGRAM

SEXECUTE IRJON

SIRJON MAP

SIBFTC PSGRID DECK,DD,FULIST,REF

SUBROUTINE PSGRID

C MODIFIED SPECTRAL DENSITY PROG STARTED 10 SEPT 1964

INTEGER OUTAPE, FLAG

COMMON: /ARRAYS/ SH(105,100), PHI(50,25), R(25,25), G(3,3)

1 /SIZES/ MX, MY, NBR, NBS, NSHX, NSHY, NFX, DX, DY, NRHO

2 /CONTRL/ IPT(8), FLAG, ITIME, OUTAPE

3 * /LAB/ LABEL(12), NID

DIMENSION GA(50,25), F(50,50), FB(50,50), W(50,25), FS(50,50),

1 HEAD(6,6)

DATA HEAD(1,1) / 34HMEAN LAGGED PRODUCTS, (COVAR) /

1 HEAD(1,2) / 34HRAW SPECTRUM, (F) /

2 HEAD(1,3) / 34HSMOOTHED SPECTRUM, (F-RAP) /

3 HEAD(1,4) / 34HLAGGED PRODUCTS OF SMOOTHING COEF, /

4 HEAD(1,5) / 34HFOURIER TRANSFORMS OF L,P,S,C, /

5 HEAD(1,6) / 34HCORRECTED SPECTRUM, (F-STAR) /

EQUIVALENCE (FS,FB), (GA,W)

C1

READ IN INPUT DATA

PI2 = 2.0*3.14159

C COMPUTE THE MEAN LAGGED PRODUCTS (COVARIANCES)

C A LESS THAN ZERO

212 NGHX=MX+1

NGHY=MY+1

NGX=NGHX+MX

D012718=1, MX

K60=MX+1-18

K67=NSHX-K60

D0127J8=1, NGHY

K70=J8-1

K68=NSHY-K70

C13A

SUM=0.0

D012816=1, K67

I7=K60+16.

D0128J7=1, K68

JA=K70+J7

TFMP=SH(I7,J7)*SH(I6,JA)

128 SUM=SUM+TFMP

D=K67*K68

127 GA(I8,J8)=SUM/D

C14

C A EQUAL TO AND GREATER THAN ZERO

213 D017718=NGHX,NGX

K60=18-MX-1

K71=NSHY-K60

GRD00000

GRD00010

GRD00020

GRD00030

GRD00040

GRD00050

GRD00060

GRD00070

GRD00080

GRD00090

GRD00100

GRD00110

GRD00120

GRD00130

GRD00140

GRD00150

GRD00160

GRD00170

GRD00180

GRD00190

GRD00200

GRD00210

GRD00220

GRD00230

GRD00240

GRD00250

GRD00260

GRD00270

GRD00280

GRD00290

GRD00300

GRD00310

GRD00320

GRD00330

GRD00340

GRD00350

GRD00360

GRD00370

GRD00380

GRD00390

GRD00400

GRD00410

GRD00420

GRD00430

GRD00440

GRD00450

GRD00460

GRD00470

GRD00480

GRD00490

GRD00500

	DO177J8=1,NGHY	GRD00510
	K70=J8-1	GRD00520
	K72=NSHY-K70	GRD00530
C14A	SUM=0.0	GRD00540
	DO178I7=1,K71	GRD00550
	I6=I7+K60	GRD00560
	DO178J7=1,K72	GRD00570
	J6=J7+K70	GRD00580
	TEMP=SH(I7,J7)*SH(I6,J6)	GRD00590
178	SUM=SUM+TEMP	GRD00600
	D=K71*K72	GRD00610
177	GA(I8,J8)=SUM/D	GRD00620
C15		GRD00630
	IF(IPT(3) .NE. 0)	GRD00640
	1 CALL WRITER(GA, 50, 0, MY, -MX, MX, HEAD(1,1))	GRD00650
	IF(ITIME .NE. 0) CALL TIME(1)	GRD00660
C16		GRD00670
C	RAW SPECTRAL CALCULATIONS	GRD00680
215	NEFY=2*MY+1	GRD00690
	NFX=2*MX+1	GRD00700
	FY=NEFY	GRD00710
	FX=NFX	GRD00720
	LPMX = MX + 1	GRD00730
	LPMY = MY + 1	GRD00740
	DO131I10=1,NFX	GRD00750
	ALPHA = I10 - LPMX	GRD00760
	ALPHA = ALPHA / FX	GRD00770
	DO131J10=1,NEFY	GRD00780
	BETA = J10 - LPMY	GRD00790
	BETA = BETA / FY	GRD00800
	SUM=0.0	GRD00810
C17		GRD00820
	DO136I9=1,NGX	GRD00830
	A = I9 - LPMX	GRD00840
	A = A * ALPHA	GRD00850
	DO132J9=2,NGHY	GRD00860
	RE= J9-1	GRD00870
	ANG1 = PI2 * (A + RE * BETA)	GRD00880
C17A		GRD00890
	TEMP= GA(I9,J9)*COS(ANG1)	GRD00900
132	SUM=SUM+TEMP*2.0	GRD00910
	ANG2 = PI2 * A	GRD00920
136	SUM=SUM+GA(I9,1)*COS(ANG2)	GRD00930
131	F(I10,J10)=DX*DY*SUM	GRD00940
C18		GRD00950
	IF(IPT(4) .NE. 0)	GRD00960
	1 CALL WRITER(F, 50, -MY, MY, -MX, MX, HEAD(1,2))	GRD00970
	IF(ITIME .NE. 0) CALL TIME(1)	GRD00980
C19		GRD00990
C	SMOOTHED SPECTRUM	GRD01000
C	INSIDE MATRIX	GRD01010
217	NFX=NFX-1	GRD01020
	NEFY=NEFY-1	GRD01030
		GRD01040

	D0140I13=2,NFBX	GRD01050
	D0140J13=2,NFBY	GRD01060
	SUM=0.0	GRD01070
	D0141I11=1.3	GRD01080
	I12=I13+I11-2	GRD01090
	D0141J11=1.3	GRD01100
	J12=J13+J11-2	GRD01110
C20	TEMP=G(I11,J11)*F(I12,J12)	GRD01120
141	SUM=SUM+TEMP	GRD01130
140	FB(I13,J13)=SUM	GRD01140
C21		GRD01150
218	D0142I13=2,NFBX	GRD01160
	SUM=0.0	GRD01170
	SUMA=0.0	GRD01180
	D0143I14=1.3	GRD01190
	I15=I13+I14-2	GRD01200
	TEMP=G(I14,I1)*F(I15,2)+G(I14,2)*F(I15,1)+G(I14,3)*F(I15,2)	GRD01210
	TEMPA=G(I14,1)*F(I15,NFBY)+G(I14,2)*F(I15,NFY)+G(I14,3)	GRD01220
	X*F(I15,NFBY)	GRD01230
	SUM=SUM+TEMP	GRD01240
143	SUMA=SUMA+TEMPA	GRD01250
	FB(I13,1)=SUM	GRD01260
142	FB(I13,NFY)=SUMA	GRD01270
C22		GRD01280
219	D0144J13=2,NFBY	GRD01290
	SUM=0.0	GRD01300
	SUMA=0.0	GRD01310
	D0145J14=1.3	GRD01320
	J15=J14+J13-2	GRD01330
	TEMP=G(1,J14)*F(2,J15)+G(2,J14)*F(1,J15)+G(3,J14)*F(2,J15)	GRD01340
	TEMPA=G(1,J14)*F(NFBX,J15)+G(2,J14)*F(NFY,J15)+G(3,J14)	GRD01350
	X*F(NFBX,J15)	GRD01360
	SUM=SUM+TEMP	GRD01370
145	SUMA=SUMA+TEMPA	GRD01380
	FB(1,J13)=SUM	GRD01390
144	FB(NFY,J13)=SUMA	GRD01400
C23		GRD01410
220	K27=2	GRD01420
	K28=1	GRD01430
	K29=2	GRD01440
	K30=1	GRD01450
	D0146L19=1.4	GRD01460
	SUM=0.0	GRD01470
	K26=K29	GRD01480
	D0147L20=1.3	GRD01490
	TEMP=G(L20,1)*F(K26,K27)+G(L20,2)*F(K26,K28)+G(L20,3)*F(K26,K27)	GRD01500
C24		GRD01510
	I*F(L20-2)I48,I49,I47	GRD01520
148	K26=K30	GRD01530
	GOTO147	GRD01540
149	K26=K29	GRD01550
	GOTO147	GRD01560
147	SUM=SUM+TEMP	GRD01570
		GRD01580

C25

GOTO(150,151,152,154),L19
150 FB(1:1)=SUM
K29=NF BX
K30=NF X
GOTO146
151 FB(NFX:1)=SUM
K29=2
K30=1
K27=NF BY
K28=NF Y
GOTO146

C26

152 FB(1,NFY)=SUM
K29=NF BX
K30=NF X
GOTO146
154 FB(NFX,NFY)=SUM
146 CONTINUE

C27

IF(IPT(5),NE, 0)
1 CALL WRITER(FB, 50, -MY, MY, -MX, MX, HEAD(1:3))
IF(ITIME,NE, 0) CALL TIME(1)
IF (FLAG) 222, 222, 226

C28

C COMPUTE CORRECTION COEFFICIENTS
C U LESS THAN ZERO

222 N2R=NRHO+NRHO
D0157118=1:N2R
K38=N2R+1-118
K40=NBR-K38
D0157J18=1:NBS
K39=J18-1
K41=NBS-K39

C29

SUM=0.0
D0158117=1:K40
I19=117+K38
D0158J19=1:K41
J17=J19+K39
TEMP=B(117,J17)*B(119,J19)
156 SUM=SUM+TEMP
157 W(118,J18)=SUM

C30

C U EQUAL TO OR GREATER THAN ZERO

223 D0159118=NBR,NWX
K42=118-NBR
K40=NBR-K42
D0159J18=1:NBS
K39=J18-1
K41=NBS-K39

C30A

SUM=0.0

GRD01590
GRD01600
GRD01610
GRD01620
GRD01630
GRD01640
GRD01650
GRD01660
GRD01670
GRD01680
GRD01690
GRD01700
GRD01710
GRD01720
GRD01730
GRD01740
GRD01750
GRD01760
GRD01770
GRD01780
GRD01790
GRD01800
GRD01810
GRD01820
GRD01830
GRD01840
GRD01850
GRD01860
GRD01870
GRD01880
GRD01890
GRD01900
GRD01910
GRD01920
GRD01930
GRD01940
GRD01950
GRD01960
GRD01970
GRD01980
GRD01990
GRD02000
GRD02010
GRD02020
GRD02030
GRD02040
GRD02050
GRD02060
GRD02070
GRD02080
GRD02090
GRD02100
GRD02110
GRD02120

DO160I17=1;K40	GRD02130
I19=I17+K42	GRD02140
DO160J17=1;K41	GRD02150
J19=J17+K39	GRD02160
TEMP=B(I17,J17)*B(I19,J19)	GRD02170
160 SUM=SUM+TEMP	GRD02180
159 W(I18,J18)=SUM	GRD02190
C31	GRD02200
IF(IPT(6) ,NE, 0)	GRD02210
1 CALL WRITER(W, 50, 0, NBS-1, -NBR+1, NWX-NBR, WPA0(1,4))	GRD02220
IF(ITIME ,NE, 0) CALL TIME(1)	GRD02230
C32	GRD02240
LPWX = MX + 1	GRD02250
225 DO165I20=1,NFX	GRD02260
S = I20 - LPWX	GRD02270
S = S / FX	GRD02280
DO165J20=1,NGHY	GRD02290
T=J20-1	GRD02300
T = T / FY	GRD02310
SUM=0.0	GRD02320
DO167 I21=1,NWX	GRD02330
U=I21-NBR	GRD02340
U = U * S	GRD02350
DO166 J21=2,NBS	GRD02360
V=J21-1	GRD02370
C33	GRD02380
ANG1 = PI/2 * (U - V * T)	GRD02390
TEMP=W(I21,J21)*COS (ANG1)	GRD02400
166 SUM=SUM+TEMP*2.0	GRD02410
ANG2 = PI/2 * U	GRD02420
167 SUM=SUM+W(I21,1)*COS (ANG2)	GRD02430
IF(ABS(SUM).LT. 0.00001) SUM=SIGN(0.000001,SUM)	GRD02440
165 PHI(I20,J20)=SUM	GRD02450
C34	GRD02460
WRITE(OUTAPE,110) ((PHI(I,J), I = 1, NFX), J = 1, NGHY)	GRD02470
WRITE (OUTAPE,103)	GRD02480
226 IF(IPT(7) ,NE, 0)	GRD02490
1 CALL WRITER(PHI, 50, 0, NGHY-1, -MX, MY, HEAD(1,5))	GRD02500
IF(ITIME ,NE, 0) CALL TIME(1)	GRD02510
C34A	GRD02520
C35	GRD02530
227 DO169I22=1,NFX	GRD02540
DO169J22=1,NFY	GRD02550
I23=I22	GRD02560
J23=NGHY+1-J22	GRD02570
IF(J22.GT.MY) J23=J22-MY	GRD02580
169 FS(I22,J22)=FB(I22,J22)/PHI(I23,J23)	GRD02590
K50=NGHX+1	GRD02600
K51=NGHY+1	GRD02610
FS(NGHX,NGHY)=(FS(MX,K51)+FS(NGHX,K51)+FS(K50,K51)+FS(K50,NGHY))/	GRD02620
X4.0	GRD02630
C36	GRD02640
WRITE (OUTAPE,101) LABEL, MID, MX, MY	GRD02650
WRITE (OUTAPE,110) ((FS(I,J), I = 1, NFX), J = 1, NFY)	GRD02660

IF(IPT(8) .NE. 0)	GRD02670
1 CALL WRITER(FS, 50, -MY, MY, -MX, MX, HEAD(1:6))	GRD02680
IF(ITIME .NE. 0) CALL TIME(1)	GRD02690
RETURN	GRD02700
	GRD02710
101 FORMAT(12A6,1B/2I10,60XA1)	GRD02720
102 FORMAT(7F10,3,10X)	GRD02730
103 FORMAT(7I1H/8XA1)	GRD02740
110 FORMAT(4E15,8,20X)	GRD02750
END	GRD02760
SIBPTC IN DECK,DD,FULIST,REF	GRD02770
INTEGER OUTAPE, FLAG	GRD02780
	GRD02790
COMMON /ARRAYS/ SH(105,100), PH1(50,25), B(25,25), G(3,3)	GRD02800
1 /SIZES/ MX, MY, NBR, NBS, NSHX, NSHY, NFX, DY, NRMO	GRD02810
2 /CONTRL/ IPT(8), FLAG, ITIME, OUTAPP	GRD02820
3 /LAB/ LABEL(12), MID	GRD02830
	GRD02840
	GRD02850
DIMENSION H(105,100), HEAD(6,3), ELABEL(12)	GRD02860
	GRD02870
EQUIVALENCE (H,SH), (10,MID)	GRD02880
	GRD02890
DATA ICTL, AST, SLASH, DOL, ISW, JEC, IPIN / SHSGRDP, IM, IM/	GRD02900
1 IM, 1, 1, SHSFNIS /	GRD02910
2 HEAD(1,1) / 32HTHE SMOOTHING COEFFICIENTS /	GRD02920
3 HEAD(1,2) / 32HTHE ELEVATION MATRIX /	GRD02930
4 HEAD(1,3) / 32HTHE SMOOTHED MATRIX /	GRD02940
	GRD02950
	GRD02960
CALL TIME(0)	GRD02970
	GRD02980
1000 READ (5,100) 1, INTAPE, OUTAPE, FLAG, IBUG, IBTAP, ITIME, IPT, ID	GRD02990
IF(1 .EQ. IPIN) GO TO 500	GRD03000
IF(1 .NE. ICTL) GO TO 200	GRD03010
	GRD03020
IF(IBTAP .EQ. 0 .OR. OUTAPE .EQ. 6) GO TO 1002	GRD03030
1001 READ (OUTAPE,106) ELABEL, CODE	GRD03040
IF(CODE .NE. AST) GO TO 1001	GRD03050
BACKSPACE OUTAPE	GRD03060
WRITE (OUTAPE,306)	GRD03070
	GRD03080
	GRD03090
1002 JEC = 1	GRD03100
	GRD03110
IF(IBUG .EQ. 0) GO TO 1	GRD03120
PRINT 108	GRD03130
PAUSE	GRD03140
CALL SWITCH(6,1)	GRD03150
IF(1 .EQ. 1) GO TO 501	GRD03160
	GRD03170
1 JTAPE = 5	GRD03180
IF(INTAPE .GT. 0) JTAPE = INTAPE	GRD03190
	GRD03200
2 READ (JTAPE,101) LABEL, IDT	GRD03210

IF(1DT .NE. 1D) GO TO 2	GRD03220
LTAPF = 5	GRD03230
IF(FLAG .NE. 0) LTAPF = INTAPF	GRD03240
IF(ISW1 .EQ. 0) GO TO 21	GRD03250
READ (LTAPF,102) DX, DY	GRD03260
READ (LTAPF,103) NX, NY, NRHO, NSIG, MX, MY	GRD03270
READ (LTAPF,102) ((G(I,J), I = 1, 3), J = 1, 3)	GRD03280
NSHX = NX - 2 * NRHO	GRD03290
NSHY = NY - 2 * NSIG	GRD03300
NBR = NRHO * 2 + 1	GRD03310
NBS = NSIG * 2 + 1	GRD03320
NHS = NSIG + 1	GRD03330
21 WRITE (6,104) LABEL, NX, NY, NBR, NBS, MX, MY, DX, DY, (1, I = 1, 3), (J, (G(I,J), I = 1, 3), J = 1, 3)	GRD03340
IF(FLAG .NE. 0) GO TO 8	GRD03350
WRITE (6,109) OUTAPF, NID	GRD03360
IF(ISW1 .EQ. 0) GO TO 31	GRD03370
READ (LTAPF,102) ((B(I,J), I = 1, NBR), J = NHS, NBS)	GRD03380
DO 3 I = 1, NBR	GRD03390
I1 = NBR + 1 - I	GRD03400
DO 3 J = 1, NSIG	GRD03410
J1 = NBS + 1 - J	GRD03420
3 B(I,J) = B(I1,J1)	GRD03430
31 CALL WRITER(B, 25, -NSIG, NSIG, -NRHO, NRHO, HEAD(1:1))	GRD03440
DO 4 I = 1, NX, 5	GRD03450
I1 = I + 4	GRD03460
4 READ (JTAPE,105) ((H(J1,J), J1 = 1, I1), J = 1, NY)	GRD03470
READ (JTAPE,106) ELABEL, CODE, ISWR	GRD03480
ISW1 = 3	GRD03490
IF(CODE .EQ. AST) ISW1 = 2	GRD03500
IF(CODE .EQ. SLASH) ISW1 = 1	GRD03510
IF(CODE .EQ. DOL) ISW1 = 0	GRD03520
IF(ISW1 .EQ. 3) GO TO 201	GRD03530
IF(1BT(1) .NE. 0)	GRD03540
1 CALL WRITER(H, 105, 0, NY - 1, 0, NX - 1, HEAD(1:2))	GRD03550
DO 6 I = 1, NSHX	GRD03560
DO 6 J = 1, NSHY	GRD03570
SUM = 0.0	GRD03580
DO 5 I1 = 1, NBR	GRD03590
	GRD03600
	GRD03610
	GRD03620
	GRD03630
	GRD03640
	GRD03650
	GRD03660
	GRD03670
	GRD03680
	GRD03690
	GRD03700
	GRD03710
	GRD03720
	GRD03730
	GRD03740
	GRD03750

	12 = 1 + 11 - 1	GRD03760
	DO 5 J1 = 1, NBS	GRD03770
	J2 = J + J1 - 1	GRD03780
5	SUM = SUM + B(11,J1) * M(12,J2)	GRD03790
6	SH(1,J) = SUM	GRD03800
	11 = NSHX + 1	GRD03810
	DO 7 I = 1, NX	GRD03820
	DO 7 J = 1, NSHY	GRD03830
7	SH(I,J) = 0.0	GRD03840
	WRITE (OUTAPE,101) LABEL, N10	GRD03850
	WRITE (OUTAPE,112) DX, DY	GRD03860
	WRITE (OUTAPE,113) NSHX, NSHY, NRHO, NSIG, NX, NY	GRD03870
	WRITE (OUTAPE,111) ((G(1,J), I = 1, 3), J = 1, 3)	GRD03880
	DO 71 I = 1, NSHX, 4	GRD03890
	11 = 1 + 3	GRD03900
71	WRITE (OUTAPE,110) ((SH(J2,J), J2 = 1, 11), J = 1, NSHY)	GRD03910
	GO TO 11	GRD03920
		GRD03930
		GRD03940
		GRD03950
8	DO 9 I = 1, NX, 4	GRD03960
	11 = 1 + 3	GRD03970
9	READ (LTAPE,110) ((SH(12,J), 12 = 1, 11), J = 1, NY)	GRD03980
	NFX = 2 * NX + 1	GRD03990
	NSHY = NY + 1	GRD04000
	READ (LTAPE,110) ((PH(1,J), I = 1, NFX), J = 1, NSHY)	GRD04010
	READ (LTAPE,106) ELABEL, CODE	GRD04020
	IF(CODE ,NE, SLASH) GO TO 202	GRD04030
	ISW1 = 1	GRD04040
		GRD04050
91	READ (LTAPE,106) ELABEL, CODE	GRD04060
	IF(CODE ,NE, DOL ,AND, CODE ,NE, AST) GO TO 91	GRD04070
	IF(CODE ,EQ, AST) ISW1 = 2	GRD04080
	READ (5,103) MFX, MLX, MPY, MLY	GRD04090
	DO 10 I = MFX, MLX	GRD04100
	11 = 1 + 1 - MFX	GRD04110
	DO 10 J = MPY, MLY	GRD04120
	J1 = J + 1 - MPY	GRD04130
10	SH(11,J1) = SH(1,J)	GRD04140
		GRD04150
		GRD04160
		GRD04170
		GRD04180
		GRD04190
		GRD04200
	NSHX = MLX - MFX + 1	GRD04210
	NSHY = MLY - MPY + 1	GRD04220
	1PT(2) = 1PT(1)	GRD04230
	WRITE (6,107) MFX, MLX, MPY, MLY	GRD04240
		GRD04250
		GRD04260
		GRD04270
11	IF(1PT(2) ,NE, 0)	GRD04280
1	CALL WRITER(SH, 105, 0, NSHY - 1, 0, NSHX - 1, HEAD(1,3))	GRD04290

IF(ITIME .NE. 0) CALL TIME(1)	GRD04300
CALL PSGRID	GRD04310
IF(ISW1 .EQ. 2) GO TO 500	GRD04320
WRITE (OUTAPE,306)	GRD04330
GO TO 1000	GRD04340
	GRD04350
	GRD04360
	GRD04370
	GRD04380
	GRD04390
501 JEC = 4	GRD04400
500 WRITE (6,303)	GRD04410
DO 502 I = 1, 100	GRD04420
502 WRITE (OUTAPE,305)	GRD04430
IF(JEC .EQ. 4) WRITE (6,304)	GRD04440
STOP	GRD04450
	GRD04460
200 WRITE (6,300) JEC, I	GRD04470
GO TO 1000	GRD04480
	GRD04490
201 WRITE (6,301) ELABEL, CODE, IERR	GRD04500
STOP	GRD04510
	GRD04520
202 WRITE (6,302) ELABEL, CODE, IERR	GRD04530
STOP	GRD04540
	GRD04550
	GRD04560
100 FORMAT(A6,14I2,38X,18)	GRD04570
101 FORMAT(12A6,18)	GRD04580
102 FORMAT(7F10,3)	GRD04590
103 FORMAT(7I10)	GRD04600
104 FORMAT(21H1 INPUT PARAMETERS --12A6///6X12HINPUT MATRIX4X14.3M X 1	GRD04610
*4//6X16HSMOOTHING MATRIX14.3M X 14//6X14HNUMBER OF LAGS2X14.3M X 1	GRD04620
*4//6X13HDATA INTERVAL3XF4,1.3M X F4,1///6X33HSPECTRAL SMOOTHING M	GRD04630
*ATRIX, 6(I,J)///7X3110//16X13.3F10,3))	GRD04640
105 FORMAT(9F10,3)	GRD04650
106 FORMAT(11A6,A5,A1,18)	GRD04660
107 FORMAT(11H05X31HTHIS IS A COMPUTATION INVOLVING/6X7HCOLUMNS14.3M T	GRD04670
1014,10H AND ROWS 14.3M TO14/6X25HOP A PRE-SMOOTHED MATRIX.)	GRD04680
108 FORMAT(46H05SENSE SWITCH 6 UP AND PRESS START TO CONTINUE/50H SENSE	GRD04690
1 SWITCH 6 DOWN AND PRESS START TO TERMINATE.)	GRD04700
109 FORMAT(//6X45HTHE 10, NUMBER FOR THE ALTERNATE OUTPUT TAPE 12.4M,	GRD04710
11S18.1M.)	GRD04720
110 FORMAT(4E15,8,20X)	GRD04730
111 FORMAT(7F10,3,10X/2F10,3,60XA1)	GRD04740
112 FORMAT(2F10,3,60XA1)	GRD04750
113 FORMAT(6I10,20XA1)	GRD04760
	GRD04770
300 FORMAT(11,61HISGRIDP: CARD NOT ENCOUNTERED WHEN EXPECTED: SEARCH C	GRD04780
1ONTINUES/31H.FIRST SIX CHARS. ON CARD READ A6,A1)	GRD04790
301 FORMAT(106H18, 1// OR 1* EXPECTED AT END OF ELEVATION MATRIX.INGR	GRD04800
1 COLUMN 72, NOT FOUND. CARD AS READ APPEARS BELOW, /1H011A6,A5,A1GR	GRD04810
2,18/7EX1H*//69X7HCOL. 72//21H EXECUTION ABANDONED.)	GRD04820
302 FORMAT(104H1// OR 1* EXPECTED AT END OF FOURIER TRANSFORMS IN COL	GRD04830


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1                                = L: L2 )

RETURN
END
SIBFTC TIME    DECK,DO,REF,FULIST
SUBROUTINE TIME(INO)

INTEGER CLOCK, SEC, CURR, START

DATA KOUNT / 0 /

IF( INO .NE. 0 ) GO TO 2
START = CLOCK(DUM)
RETURN

2  CURR = CLOCK( DUM )
   KOUNT = KOUNT + 1

   IT = FLOAT( START - CURR ) * .6
   MIN = IT / 60.
   SEC = MOD( IT, 60 )
   WRITE (6,10) KOUNT, MIN, SEC

   IF( KOUNT .EQ. 1 ) GO TO 3
   IT = FLOAT( LCURR - CURR ) * .6
   MIN = IT / 60
   SEC = MOD( IT, 60. )
   WRITE (6,11) MIN, SEC

3  WRITE (6,12)
   LCURR = CURR
   RETURN

10  FORMAT(1H15X48(1H*)/6X1H*46X1H*/6X1H*3X13,25MTH CALL TO TIMER ROUTEGRD05380
11  1(NE,15X1H*/6X1H*46X1H*/6X1H*3X21MTOTAL TIME ELAPSED --14.6H MIN.,1GRD05390
2(13.5H SEC, 4X1H*) ) GRD05400
11  FORMAT(6X1H*46X1H*/6X1H*3X23MTIME SINCE LAST CALL --14.6H MIN.,11GRD05410
13.5H SEC,2X1H*)) GRD05430
12  FORMAT(6X1H*46X1H*/6X48(1H*)/1XA1) GRD05430
END GRD05440
SIBMAP CLOCK DECK GRD05450
CELL BOOL 77735 GRD05460
CLOCK SAVE GRD05470
CAL CELL GRD05480
ANA M2135 GRD05490
RETURN CLOCK GRD05500
M2135 OCT 7777 GRD05510
END GRD05520
UN07 FILE :UT2:,INOUT,BLK=14,BCD,HTON,ROUNT,HOLD,MULT,REEL GRD05530
UNIT08 FILE :UT1:,MOUNT:,INPUT,BLK=14,BCD,HTON,HOLD GRD05540
SDATA GRD05550
GRD05560
GRD05570
GRD05580
GRD05590
GRD05600
GRD05610
GRD05620
GRD05630
GRD05640
GRD05650
GRD05660
GRD05670
GRD05680
GRD05690
GRD05700
GRD05710
GRD05720
GRD05730
GRD05740
GRD05750
GRD05760
GRD05770
GRD05790
GRD05800
GRD05810
GRD05820
GRD05830
GRD05840
GRD05860

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13. ABSTRACT Power spectral densities, in one (line) and two (area) dimensions, are presented for off-road ground in eleven sites in the United States. Methods of acquiring, recording, and processing the data are described in detail.		

Unclassified

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Ground Roughness Power Spectral Density Survey Results Data Processing						

INSTRUCTIONS

1. **ORIGINATING ACTIVITY:** Enter the name and address of the contractor, subcontractor, grantee, Department of Defense activity or other organization (corporate author) issuing the report.

2a. **REPORT SECURITY CLASSIFICATION:** Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with appropriate security regulations.

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5. **AUTHOR(S):** Enter the name(s) of author(s) as shown on or in the report. Enter last name, first name, middle initial. If military, show rank and branch of service. The name of the principal author is an absolute minimum requirement.

6. **REPORT DATE:** Enter the date of the report as day, month, year, or month, year. If more than one date appears on the report, use date of publication.

7a. **TOTAL NUMBER OF PAGES:** The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.

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13. **ABSTRACT:** Enter an abstract giving a brief and factual summary of the document indicative of the report, even though it may also appear elsewhere in the body of the technical report. If additional space is required, a continuation sheet shall be attached.

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There is no limitation on the length of the abstract. However, the suggested length is from 150 to 225 words.

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